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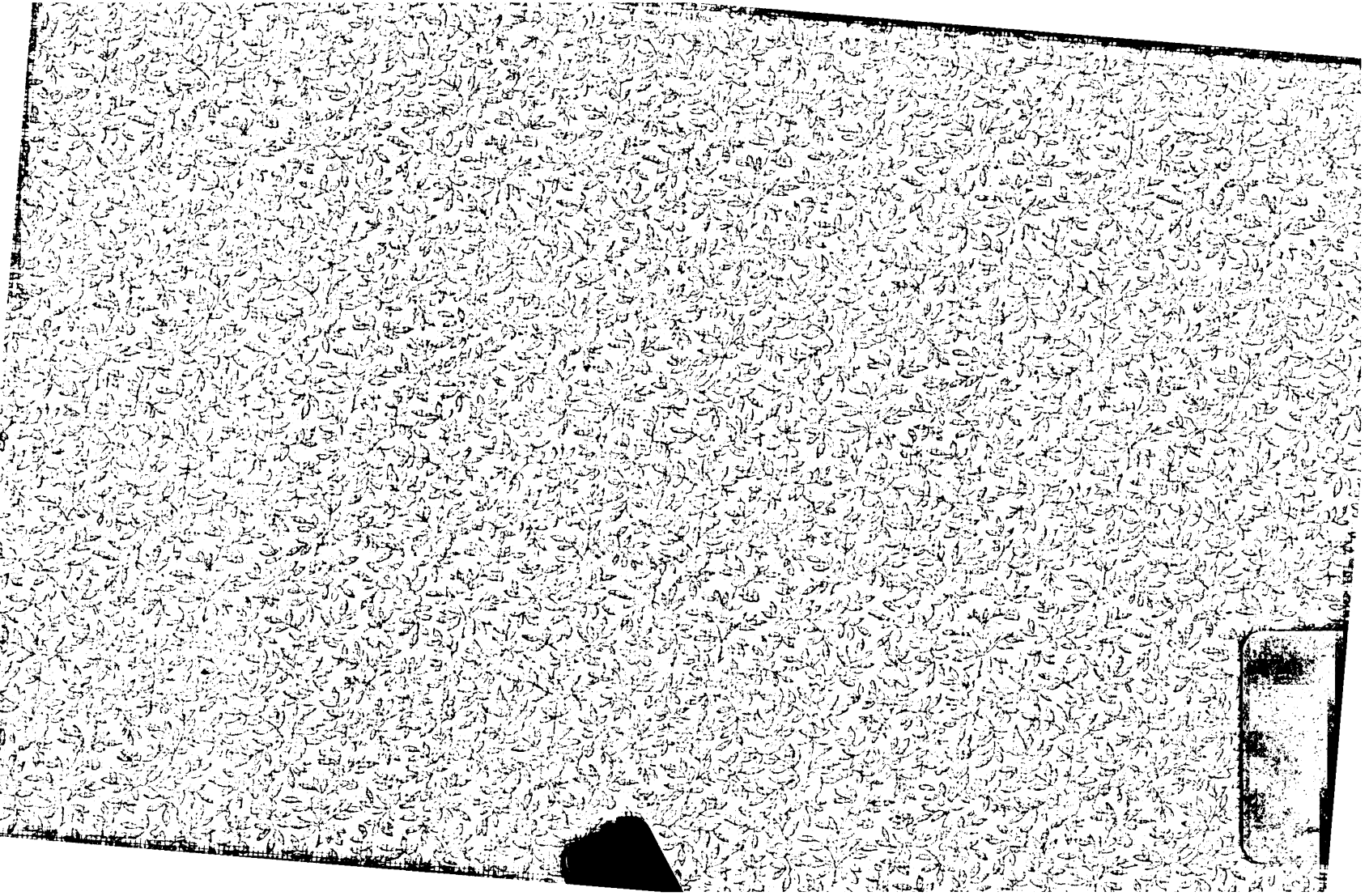

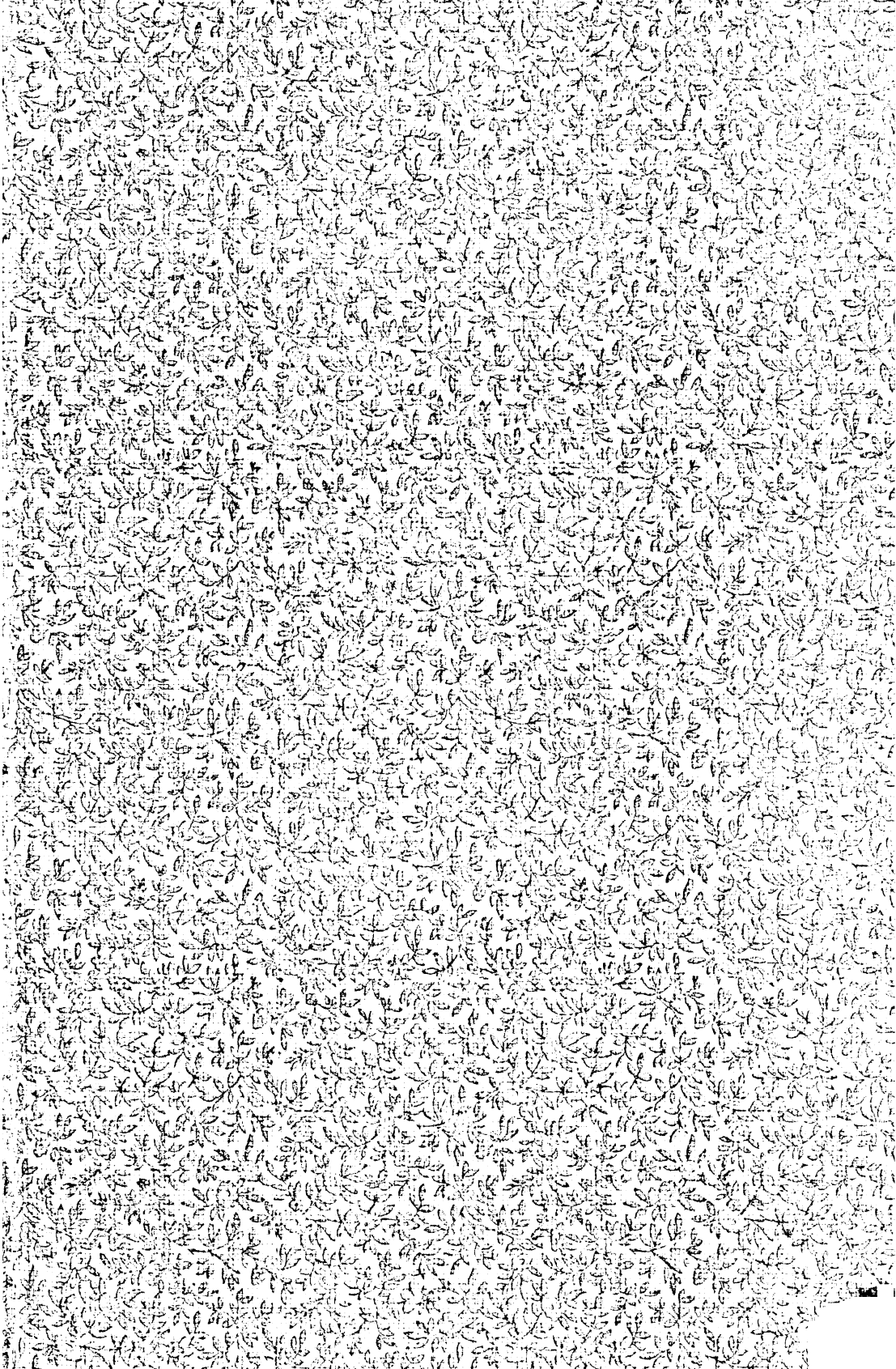

TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION

AT THE

THIRTY-SIXTH ANNUAL SESSION,

HELD AT

SARATOGA SPRINGS, N. Y.

COMMENCING ON THE 4th OF AUGUST, 1896.

PUBLICATION COMMITTEE :

GEO. H. CUSHING. E. T. DARBY. A. W. HARLAN.

PHILADELPHIA:

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PRESS OF PATTERSON & WHITE,
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LIST OF OFFICERS FROM DATE OF ORGANIZATION.

PRELIMINARY CONVENTION, NIAGARA FALLS, AUGUST, 1859.

President,	W. W. ALLPORT . . .	Chicago, Ill.
Secretary,	J. TAFT	Cincinnati, Ohio.

ORGANIZATION AND FIRST SESSION OF ASSOCIATION, WASHINGTON, D. C., JULY, 1860.

[Annual meetings to be hereafter, last Tuesday in July.]

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[No meeting in 1861.]

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BOSTON, JULY, 1866.

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Corresponding Secretary,	C. R. BUTLER . . .	Cleveland, Ohio.
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NIAGARA FALLS, JULY, 1868.

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SARATOGA SPRINGS, AUGUST, 1869 *

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NASHVILLE, AUGUST, 1870.

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Recording Secretary,	M. S. DEAN	Chicago, Ill.
Corresponding Secretary,	I. A. SALMON . . .	Boston, Mass.
Treasurer,	W. H. GODDARD . . .	Louisville, Ky.

* Owing to a change in the Constitution, officers elected at this and the sessions following served at the next annual meeting subsequent to their election; and the sessions of and after 1869 commenced on the first Tuesday in August.

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Treasurer,	W. H. GODDARD . . .	Louisville, Ky.

PHILADELPHIA, AUGUST, 1876.

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2d Vice-President,	GEO. T. BARKER . . .	Philadelphia, Pa.
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2d Vice-President,	L. D. CARPENTER . . .	Atlanta, Ga.
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Recording Secretary,	GEO. H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	M. H. WEBB	Lancaster, Pa.
Treasurer,	W. H. GODDARD . . .	Louisville, Ky.

BOSTON, AUGUST, 1880.

President,	C. N. PEIRCE	Philadelphia, Pa.
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2d Vice-President,	GEO. J. FRIEDRICHS . .	New Orleans, La.
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Corresponding Secretary,	A. M. DUDLEY . . .	Salem, Mass.
Treasurer,	W. H. GODDARD . . .	Louisville, Ky.

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Recording Secretary,	GEO. H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	A. M. DUDLEY . . .	Salem, Mass.
Treasurer,	W. H. GODDARD . . .	Louisville, Ky.

CINCINNATI, AUGUST, 1882.

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2d Vice-President,	E. T. DARBY	Philadelphia, Pa.
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Treasurer,	GEO. W. KEELY . . .	Oxford, Ohio.

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President,	J. N. CROUSE . . .	Chicago, Ill.
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Treasurer,	GEO. W. KEELY . . .	Oxford, Ohio.

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Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY . . .	Oxford, Ohio.

NIAGARA FALLS, 1886.

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2d Vice-President,	S. W. DENNIS . . .	San Francisco, Cal.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY . . .	Oxford, Ohio.

NIAGARA FALLS, 1887.

President,	FRANK ABBOTT . . .	New York City.
1st Vice-President,	CHARLES R. BUTLER . .	Cleveland, Ohio.
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Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	GEO. W. KEELY . . .	Oxford, Ohio.

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Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

SARATOGA SPRINGS, 1889.

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Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

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2d Vice-President,	H. B. NOBLE	Washington, D. C.
Recording Secretary,	GEO. H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

SARATOGA SPRINGS, 1891.

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2d Vice-President,	S. C. G. WATKINS . . .	Mont Clair, N. J.
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Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

NIAGARA FALLS, 1892.*

President,	J. D. PATTERSON . . .	Kansas City, Mo.
1st Vice-President,	J. Y. CRAWFORD . . .	Nashville, Tenn.
2d Vice-President,	S. C. G. WATKINS . . .	Mont Clair, N. J.
Recording Secretary,	GEO H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

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2d Vice-President,	THOMAS FILLEBROWN . .	Boston, Mass.
Recording Secretary,	GEO. H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	EMMA EAMES CHASE . .	St. Louis, Mo.
Treasurer,	HENRY W. MORGAN . .	Nashville, Tenn.

ASBURY PARK, N. J., AUGUST, 1895.

President,	J. Y. CRAWFORD . . .	Nashville, Tenn.
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2d Vice-President,	THOMAS FILLEBROWN . .	Boston, Mass
Recording Secretary,	GEO. H. CUSHING . . .	Chicago, Ill.
Corresponding Secretary,	EMMA EAMES CHASE . .	St. Louis, Mo.
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SARATOGA SPRINGS, AUGUST, 1896.

President,	JAMES TRUMAN . . .	Philadelphia, Pa.
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2d Vice-President,	W. R. CLIFTON . . .	Waco, Texas.
Recording Secretary,	GEO. H. CUSHING. . .	Chicago, Ill.
Corresponding Secretary,	EMMA EAMES CHASE . .	St. Louis, Mo.
Treasurer,	HENRY W. MORGAN . .	Nashville, Tenn.

* The session of 1893, owing to the holding of the World's Columbian Dental Congress, was purely formal, and by resolution was adjourned "without any election of officers, as the effect of such non-election will be, under the Constitution, to make all officers hold over." The officers elected in 1892 thus acted at the regular session of 1894.

EXECUTIVE COMMITTEE FOR SESSION OF 1897.

J. N. CROUSE, Chairman. C. N. PEIRCE, Secretary.

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J. N. CROUSE. W. W. WALKER. *T. S. WATERS.

SECOND DIVISION—ON CREDENTIALS, ETHICS, AND AUDITING ACCOUNTS.

V. H. JACKSON. LOUIS OTTOFY. *H. A. SMITH.

THIRD DIVISION—ON VOLUNTARY ESSAYS.

*C. N. PEIRCE. S. G. PERRY. A. O. HUNT.

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* These go out August, 1897.

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MINUTES OF TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION,

SESSION OF 1896.

BY GEORGE H. CUSHING, SECRETARY.

FIRST DAY—MORNING SESSION.

THE AMERICAN DENTAL ASSOCIATION commenced its thirty-sixth annual session in the ball-room of the Grand Union Hotel, Saratoga Springs, N. Y., at 11 A.M., Tuesday, August 4, 1896; the President, Dr. J. Y. Crawford, in the chair.

Prayer was offered by Dr. W. H. Morgan.

On motion, the roll-call and also the reading of the printed minutes were dispensed with.

The following were found either to be present or to have forwarded their dues:

ABBOTT, FRANK	22 West Fortieth st., New York.
ADAMS, GEORGE E.	Box 76, South Orange, N. J.
ALLEN, T. M.	Birmingham, Ala.
AMBLER, H. L.	176 Euclid ave., Cleveland, O.
BARBER, L. L.	311 Summit st., Toledo, O.
BARLOW, F. C.	Elizabeth, N. J.
*BARNES, HENRY	New England Bldg., Cleveland, O.
BARRETT, W. C.	208 Franklin st., Buffalo, N. Y.
BETHEL, L. P.	Kent, O.
BISHOP, J. ADAMS	30 West Forty-eighth st., New York.

Those marked thus (*) were not present, but sent their dues.
Those marked thus (*d*) were delegates, but not permanent members.

BOGUE, E. A.	63 West Forty-eighth st., New York.
*BOLLINGER, P. S.	Ludlow st., Dayton, O.
BOICE, ALONZO	1612 Vine st., Philadelphia, Pa.
BOSWELL, H. H.	322 Franklin st., Buffalo, N. Y.
BRACKETT, C. A.	102 Touro st., Newport, R. I.
BROPHY, TRUMAN W.	Champlain Bldg., Chicago, Ill.
*BROWN, S. B.	Fort Wayne, Ind.
BROWN, A. J.	912 Fourteenth st., N. W., Washington, D. C.
BURKHART, H. J.	Batavia, N. Y.
BUTLER, C. S.	680 Main st., Buffalo, N. Y.
CANADAY, J. W.	383 State st., Albany, N. Y.
CARROLL, C. C.	Meadville, Pa.
CASSIDY, J. S.	732 Madison ave., Covington, Ky.
*CHASE, EMMA EAMES	3334 Washington ave., St. Louis, Mo.
*CHASE, W. G.	40 Nassau st., Princeton, N. J.
CHITTENDEN, C. C.	21 West Main st., Madison, Wis.
CLIFTON, W. R.	Waco, Texas.
*COLDING, HENRY S.	105 Jones st., Savannah, Ga.
COGAN, WM. N.	1754 M st., N. W., Washington, D. C.
*CONRAD, WM.	321 North Grand ave., St. Louis, Mo.
*COOK, C. D.	133 Pacific st., Brooklyn, N. Y.
COWARDIN, L. M.	407 E. Main st., Richmond, Va.
CRAWFORD, J. Y.	Jackson Building, Nashville, Tenn.
CROUSE, J. N.	2231 Prairie ave., Chicago, Ill.
*CRYER, M. H.	1527 Arch st., Philadelphia, Pa.
CULVER, M. B	1529 Locust st., Philadelphia, Pa.
CUSHING, GEORGE H	31 Washington st., Chicago, Ill.
CUSTER, LEVITT E.	16 E. Third st., Dayton, O.
*DARBY, E. T.	1513 Walnut st., Philadelphia, Pa.
*DAVENPORT, I. B	30 Avenue de l'Opera, Paris, France.
DAVIS, A. W.	Holton, Kan.
DAVIS, L. L.	1303 Columbus Memorial Building, Chicago, Ill.
DEWEY, S. B.	29 Euclid ave., Cleveland, O.
DONNALLY, WILLIAMS	1022 Fourteenth st., Washington, D.C.
EDMONDS, NELSON D.	Cor. Wood and Harrison sts., Chicago, Ill.
ELLIOTT, W. ST. GEORGE	25 West Forty-fourth st., New York.
ESSIG, CHARLES J.	1700 Locust st., Philadelphia, Pa.
EVANS, GEORGE	49 West Thirty-ninth st., New York.
*FARRAR, J. N.	1271 Broadway, cor. Thirty-second st., New York.
FAUGHT, L. ASHLEY	1415 Walnut st., Philadelphia, Pa.
*FIELD, GEORGE L.	Cor. Woodward and Adams aves., North Detroit, Mich.
FILLEBROWN, THOMAS	157 Newbury st., Boston, Mass.

FINLEY, M. F.	1928 I st., Washington, D. C.
FRAZIER, JOHN E.	Birmingham, Ala.
*FREEMAN, S.	965 Madison ave., New York.
*FREEMAN, S. A.	641 Main st., Buffalo, N. Y.
FOSTER, SHEPPARD W.	Inman Bldg., Atlanta, Ga.
FULLER, A. H.	S. E. cor. Eighth & Locust sts., St. Louis, Mo.
*FUNDENBERG, W. H.	Lewis Block, Pittsburg, Pa.
*FUNDENBERG, W. F.	Lewis Block, Pittsburg, Pa.
GASKILL, J. HOWARD	1629 Walnut st., Philadelphia, Pa.
GAYLORD, EDWARD S.	63 Trumbull st., New Haven, Conn.
*GILBERT, S. ELDRED	1627 Columbia ave., Philadelphia, Pa.
*GILMER, THOS. L.	126 State st., Chicago, Ill.
*GILSON, ALFRED H.	7 Temple Place, Boston, Mass.
GOLDSMITH, SAMUEL L.	129 E. Sixtieth st., New York.
GREENBAUM, LEO	1435 Girard ave., Philadelphia, Pa.
*GREGORY, FRANK G.	7 W. Park st., Newark, N. J.
GRISWOLD, W. E.	Sixteenth & California sts., Mack Block, Denver, Col.
GUILFORD, S. H.	1728 Chestnut st., Philadelphia, Pa.
*HACKER, T. S.	28½ E. Ohio st., Indianapolis, Ind.
HARLAN, A. W.	Masonic Temple, Chicago, Ill.
HARPER, W. E.	3456 Wabash ave., Chicago, Ill.
*HARROUN, C. H.	319 Superior st., Toledo, O.
HART, JOHN I.	118 W. Fifty-fifth st., New York.
HART, R. J.	Janesville, Wis.
HARVEY, H. T.	Trump Bldg., Battle Creek, Mich.
HARVEY, H. F.	129 Euclid ave., Cleveland, O.
*HAYWARD, T. T.	Oneida Bldg., Minneapolis, Minn.
HEAD, JOSEPH	1415 Walnut st., Philadelphia, Pa.
HITCH, D. M.	3315 Baring st., Philadelphia, Pa.
*HOFF, N. S.	Ann Arbor, Mich.
HOLLAND, FRANK	124 Whitehall st., Atlanta, Ga.
*HOLMES, E. S.	New Aldrich Block, Grand Rapids, Mich.
HORTON, W. P.	106 Euclid ave., Cleveland, O.
HOW, W. STORER	Chestnut st., cor. Twelfth, Philadelphia, Pa.
HOYSRADT, G. W.	Ithaca, N. Y.
*HUEY, R.	330 S. Fifteenth st., Philadelphia, Pa.
*HULL, H. A.	Lock Box 34, New Brunswick, N. J.
HUNT, A. O.	Chicago, Ill.
HUNT, GEO. EDWIN	89 E. Ohio st., Indianapolis, Ind.
HURLBUT, J. S.	Springfield, Mass.
*IREDELL, HARVEY	Cor. Church and Nelson sts., New Brunswick, N. J.
*JACK, LOUIS	1533 Locust st., Philadelphia, Pa.

*JACKMAN, W. T.	106 Euclid ave., Cleveland, O.
JACKSON, V. H.	240 Lenox ave., New York.
JACKSON, H. H.	317 Jefferson ave., Detroit, Mich.
JEFFERIS, C. R.	908 King st., Wilmington, Del.
*JOHNS, S. H.	508 King st., Wilmington, Del.
*JOHNSON, G. E.	35 W. Washington st., Fort Wayne, Ind.
*JOHNSON, C. N.	31 Washington st., Chicago, Ill.
JONES, DANIEL A.	746 Chapel st., New Haven, Conn.
JONES, VICTOR S.	Bethlehem, Pa.
*KEITH, H. H.	3201 Washington ave., St. Louis, Mo.
KEMPLE, F. C.	Bellaire, O.
KESTERSON, R. N.	Cor. Gay & Union sts., Knoxville, Tenn.
KETTIG, EDWARD M.	319 W. Walnut st., Louisville, Ky.
KIRK, EDWARD C.	University of Pennsylvania, Philadelphia, Pa.
*KNAPP, J. ROLLO	102 Canal st., New Orleans, La.
*KNOWLES, SAMUEL E.	139 Post st., San Francisco, Cal.
LEROY, LOUIS C.	6 Lexington ave., New York.
*LITCH, WILBUR F.	1507 Walnut st., Philadelphia, Pa.
d LITTIG, J. BOND	113 W. Forty-seventh st., New York.
MAERCKLEIN, B. G.	Iron Block, Milwaukee, Wis.
*MARSHALL, JOHN S.	1012 Venetian Bldg., Chicago, Ill.
MEEKER, CHARLES A.	29 Fulton st., Newark, N. J.
MENGES, THEO.	Cor. Franklin & Madison sts., Chicago, Ill.
MOLYNEAUX, GRANT	S. E. cor. Seventh & Elm sts., Cincinnati, O.
MOORE, J. HALL	104 N. Ninth st., Richmond, Va.
MORGAN, HENRY W.	211 N. High st., Nashville, Tenn.
MORGAN, W. H.	211 N. High st., Nashville, Tenn.
MORRISON, W. N.	1401 Washington ave., St. Louis, Mo.
MURLLESS, FREDERICK T., JR.	Windsor Locks, Conn.
MCFADDEN, H. B	3505 Hamilton st., Philadelphia, Pa.
d MCGOVERN, E. E.	Vergennes, Vt.
MCKELLOPS, H. J.	3548 Lindell ave., St. Louis, Mo.
MCLEAN, W. T.	Cor. Fifth and Race sts., Cincinnati, O.
*MCMANUS, HARRY	32 Pratt st., Hartford, Conn.
*MCMANUS, JAMES	32 Pratt st., Hartford, Conn.
*MCQUILLEN, DANIEL N.	1628 Chestnut st., Philadelphia, Pa.
NASON, GEORGE S.	446 Bee Bldg., Omaha, Neb.
NOBLE, H. B.	1324 New York ave., Washington, D.C.
*NORTHROP, A. L.	57 West Forty-ninth st., New York.
OTTOFY, LOUIS	1228 Masonic Temple, Chicago, Ill.
*PAGE, W. E.	16 Arlington st., cor. Newbury, Boston, Mass.

PALMER, CORYDON	Warren, O.
*PALMER, STEWART B.	225 S. Warren st., Syracuse, N. Y.
PATTERSON, J. D.	Keith & Perry Building, Kansas City, Mo.
PEABODY, FRANCIS	103 East Chestnut st., Louisville, Ky.
PECK, A. H.	65 Randolph st., Chicago, Ill.
PEIRCE, C. N.	1415 Walnut st., Philadelphia, Pa.
PERRY, S. G.	46 West Thirty-seventh st., New York.
PRIEST, A. N.	286 Genesee st., Utica, N. Y.
*PRUYN, CHARLES P.	100 State st., Chicago, Ill.
*REMINGTON, F. A.	57 West Forty-ninth st., New York.
RHEIN, MEYER L.	38 East Sixty-first st., New York.
RICHARDS, W. H.	Knoxville, Tenn.
RICHARDSON, W. E.	101 Main st., Batavia, N. Y.
*ROHLAND, C. B.	123 Third st., Alton, Ill.
ROSS, A. O.	807 North High st., Columbus, O.
RUSH, R. A.	Selma, Ala.
SEIP, HOWARD S.	Allentown, Pa.
*SHEPARD, L. D.	330 Dartmouth st., cor. Beacon st., Boston, Mass.
*SHRYOCK, W. W.	27 West Berry st., Fort Wayne, Ind.
SILL, CHARLES	301 West Twelfth st., New York.
SLEGEL, E.	Reading, Pa.
*SMITH, D. D.	1629 Walnut st., Philadelphia, Pa.
*SMITH, H. T.	128 Garfield Place, Cincinnati, O.
SMITH, B. HOLLY	1007 Madison ave., Baltimore, Md.
*SMITH, EUGENE H.	283 Dartmouth st., Boston, Mass.
SMITH, H. A.	128 Garfield Place, Cincinnati, O.
*SPEAKMAN, W. C.	822 West st., Wilmington, Del.
*STAINTON, C. W.	47 North Pearl st., Buffalo, N. Y.
*STARR, A. R.	8 East Ninety-second st., New York.
STELLWAGEN, THOMAS C.	Chestnut st., Philadelphia, Pa.
STEPHAN, J. F.	29 Euclid ave , Cleveland, O.
*STEVENS, B. Q.	Southeast cor. Main and Broadway, Hannibal, Mo.
*STOCKTON, C. S.	17 West Park st., Newark, N. J.
*STRAIGHT, MILTON B.	80 West Huron st., Buffalo, N. Y.
SUTPHIN, HERBERT S.	24 East Kinney st., Newark, N. J.
TAFT, J.	Berkshire Building, Cincinnati, O.
TALBOTT, R. W.	1111 F st., Washington, D. C.
TAYLOR, L. C.	26 Pratt st., Hartford, Conn.
d TEMPLETON, J. G.	435 Tenth ave., Pittsburg, Pa.
THOMPSON, HENRY C.	1113 Pennsylvania ave., Washington, D. C.
TILESTON, H. B.	433 Fourth ave., Louisville, Ky.
TRUMAN, JAMES	4505 Chester ave., Philadelphia, Pa.
ULRICH, H. G.	521 North Charles st., Baltimore, Md.

VAN VLECK, CHARLES K. . .	536 Warren st., Hudson, N. Y.
VAN DE WATER, I. N. . . .	Madison, N. J.
WASSALL, J. W.	N.W. cor. State and Washington sts., Chicago, Ill.
WATERS, T. S.	756 N. Eutaw st., Baltimore, Md.
WATKINS, S. C. G. . . .	Montclair, N. J.
*WATROUS, O. S. . . .	267 Main st , Middletown, Conn.
WEEKS, THOS. E. . . .	Dayton Building, Minneapolis, Minn.
WILSON, GEO. H.	44 Euclid ave., Cleveland, O.
WILLIAMS, JACOB L. . . .	4 Walnut st., Boston, Mass.
WILSON, I. P.	Burlington, Ia.
*WILSON, P. J.	29 Prospect ave., Trenton, N J.
*WOLF, J. L.	1313 New York ave., Washington, D. C.
WRIGHT, A. M.	38 Third st., Troy, N. Y.
*WHITFIELD, GEORGE M. . .	215 S. Sixth st., Newark, N. J.

Any inaccuracies in the above list in name or location should be reported to the Treasurer at once, in order that the necessary corrections may be made.

Annual dues being payable in advance, no name appears on the above list except those who have paid for 1896, and the Transactions are not sent to any who have not fully paid their dues.

Dues must be paid to the Treasurer. Send draft, P. O. money order, or express order.

HENRY W. MORGAN, *Treasurer*, 211 North High st., Nashville, Tenn.

The resignations of H. W. Gillett and W. V. B. Ames were read and accepted.

A communication was read from the Indiana State Dental Association, announcing the reinstatement to membership in that body of Dr. J. E. Cravens.

A communication was read from the widow of the late Dr. J. J. R. Patrick, asking for the settlement of amount claimed to be due her late husband for examination of pre-historic crania.

It was referred to the Executive Committee.

The Publication Committee made the following report, which was referred to the Auditing Committee.

Dr. Morgan moved that the report be accepted and its recommendation adopted.

Dr. Boice moved to amend by referring it to the Executive Committee.

It was so referred.

REPORT OF PUBLICATION COMMITTEE.

SARATOGA SPRINGS, August 4, 1896.

The Publication Committee would submit the following report:

They were informed by the Executive Committee at the close of the last Session that arrangements had been made for the publication of the Transactions by The S. S. White Dental Manufacturing Company.

As usual, under the care and supervision of Mr. F. L. Hise, they have been presented in the admirable manner of former years

They were mailed to those entitled to receive them, including Societies, Libraries, and Honorary Members, on July 29, 1896.

Your Committee is unable to state why this extraordinary delay occurred.

No amount of urging had the slightest effect in hastening the work, and no inquiries as to the cause of the delay elicited any explanation. They should have been issued not later than the 1st of January, 1896, as the entire copy was in the hands of the publishers on October 28, 1895.

The Committee would suggest that the Association instruct the Executive Committee to make such contract with the publishers in the future as will guarantee the issuing of the volume in a reasonable time, say, by January 1, following the close of the Session.

There are on hand about 50 copies of the Transactions of 1893 and 1894, and 70 of 1895.

RECEIPTS AND EXPENDITURES.

Received:

From Treasurer		$30.00
" sale of Transactions		11.50
		$41.50

Expended:

For expressage, paper, copying, etc		$18.30
Knight & Leonard, for postal cards		6.00
" " " envelopes and letter-heads, A. D. A.		4.50
Postage		7.80
		$36.60
Balance due the Association		$4.90

GEORGE H. CUSHING, *Chairman.*

The Treasurer then read his report, as follows, which was referred to the Auditing Committee:

REPORT OF THE TREASURER.

SARATOGA SPRINGS, August 4, 1896.

HENRY W. MORGAN, TREASURER, TO THE AMERICAN DENTAL ASSOCIATION.

DR.

Balance on hand last report	$606.93	
Collected at Asbury Park and from delinquents	1239.90	
Total receipts		$1846.83
Paid out		572.55
Leaving balance on hand		$1274.28

EXPENDITURES.

CR.

Salary, Secretary, 1894–5	$200.00
" Treasurer, 1894–5	100.00
Reporter, Session 1895	125.00
Expenses Corresponding Secretary	15.00
Chairman Section I	7.50
" " II	2.50
" " VI	15.60
" Executive Committee	32.50
Printing Dr. Patrick's reports	30.00
Chairman Publication Committee	30 00
Printing, stationery, postage, and expressage	14.45
Total	$572.55

Respectfully submitted,

HENRY W. MORGAN, *Treasurer.*

Audited and found correct.

H. A. SMITH,
V H. JACKSON,
LOUIS OTTOFY, } *Auditing Committee.*

The Corresponding Secretary's report was then read by the Recording Secretary and was adopted.

REPORT OF THE CORRESPONDING SECRETARY.

August 1, 1896.

GENTLEMEN:

The Corresponding Secretary has received no letters of importance during the past year.

Letters of inquiry relating to various subjects have been answered, and blank certificates for Delegates to the meeting of the Association have been sent to all Societies requesting them.

Bill for postage and stationery.....$1.00

Respectfully submitted,

EMMA EAMES CHASE, *Corresponding Secretary, A. D. A.*

Audited and found correct.

V. H. JACKSON,
LOUIS OTTOFY, } *Auditing Committee.*

Received payment,

August 20, 1896. EMMA EAMES CHASE.

The Committee on the Army Medical Museum presented the following report, through its Chairman, Dr. Williams Donnally, which was referred to the Executive Committee:

REPORT OF THE COMMITTEE ON NATIONAL MUSEUM AND LIBRARY.

TO THE AMERICAN DENTAL ASSOCIATION:

The Thirty-fifth Annual Meeting of the American Dental Association, by invitation and in line with precedents of other national associations of specialists, formally recognized the Army Medical Museum and Library as the National Museum and Library of the dental profession of the United States, and appointed the undersigned a committee to co-operate with the officer in charge "in enriching its stores of dental literature and museum specimens."

Your Committee assumed the duties imposed, conscious of its own insufficiency for a work of such magnitude and vital importance. As we have labored to foster a loyal support of this cause and to promote an active effort for its advancement, we have become greatly impressed, as must any one who gives special attention to the matter, with the immense value of the opportunity herein afforded the dental profession to accomplish essential objects otherwise impossible of attainment. Never was there opportunity more freely offered a profession to demonstrate its value, to acquire a higher rank among the learned callings, to acquaint the professions and the general public with its achievements, and to secure the preservation, classification, exhibition, and facilities for the study of all things pertaining to it of present or future historical and educational value. It would be with great loss of prestige and altogether inconsistent with the general course and progressive spirit of the dental profession if we fail to utilize, equally with other specialists and the general physicians and surgeons of the country, the immeasurable advantages of this institution, covering as it does, within a building erected for the purpose, all available matters pertaining to every branch of medicine and surgery.

The Museum, in several respects the rarest of its kind extant, contains more than 35,000 specimens, and, like the Library, is open to the public,—the intellectual property of all professions and classes.

Its dental section may be made its most attractive department and the greatest object lesson of its kind in the world, if the efforts of the management are met with a corresponding interest on the part of dentists. Dr. D. L. Huntington, Deputy Surgeon-General, the chief officer of this institution, to whom this Committee is indebted for especial courtesy, has shown the most gratifying interest and encouraging effort in the development of the dental section. He has recently acquired by purchase a number of valuable and beautifully mounted specimens, most of which are rare. He also purposes to transfer to the dental section such objects as are of special interest to dentists which are now classified in other sections or distributed through the large general collection. This will enrich our section with specimens illustrating the effect of various diseases on the maxillary bones and the teeth, and with many other valuable objects which dentists could never acquire from their own resources.

The number of accessions, so far, directly from the efforts of this Committee is small,—perhaps one hundred. We are pleased, however, to report such evidence of interest on the part of individuals with whom we have corresponded as warrants the expectation of contributions of the kind especially needed, namely, series of models, apparatus, drawings, etc., illustrating various operations, methods of treatment, and their results. We also hope the leading College faculties will fully illustrate their methods of training, and otherwise utilize the institution to impart a knowledge of the extent and character of College studies and of the nature and import of the subjects taught. We are also greatly encouraged by the fact that quite a number of State and local Societies have given heed to the action of the American Dental Association, several formally indorsing its action in the premise and appointing Committees auxiliary to this Committee.* From this large visible results are certain to follow soon.

It is impossible to detail the kind of specimens desired. It is safe to say, however, that anything illustrative of any part of the subject of dentistry, or which, alone or in connection with other specimens, would throw light on the etiology, pathology, or treatment of the diseases and deformities of the teeth, jaws, etc., would attain a greatly enhanced value by being placed here as parts of a complete collection.

The Army Medical Library is, admittedly throughout the world, the largest and most complete of its kind in existence. It contains three-fourths of the medical literature of the world, and nine-tenths of the medical literature of recent years. There is a constant daily addition to its 120,000 bound volumes, 190,000 pamphlets, and 1200 current periodicals. Its literature is not only greater in volume than the medical literature of either the Library of the

*The Societies so acting are the State Societies of North Carolina, Tennessee, South Carolina, Mississippi, Maryland, District of Columbia, New Jersey, Pennsylvania, and the Valley Dental Society, a section of the Massachusetts State Society.

British Museum or the National Library of France, but covers a wider field and forms a better practical reference and working collection. The Library has acquired by purchase a large and choice collection of literature in English and other languages relating to dentistry. The voluntary contributions of publishers and authors would permit the money available for the purchase of their works to be used in other directions equally as essential to the purposes of the institution.

It would be impossible to exemplify the utilitarian purposes of such an institution as the Army Medical Museum and Library, or to say in how many ways such a great depository may be made available for the acquirement and dissemination of knowledge. Everything placed there receives and imparts light, and is enhanced in value by association for purposes of contrast and comparison. It affords the only legitimate means of reaching and teaching its thousands of intelligent visitors and advanced students, who come from the various professions and better classes everywhere to return and impart to others the information acquired.

We commend this interest as worthy the sincere, constant, and active support of every member of the dental profession, and declare the broad plans of the institution, the liberal spirit of its officers, and the generous appropriations for its maintenance, ample, with the co-operation of the dental profession, for the purpose of placing dentistry on a higher plane and consummating a work of immeasurable historical and educational value.

We respectfully recommend as a feasible plan of continuing the line of work commenced by this Committee, first, the appointment of five members of this Association as a National Committee, charged with the duty of promoting the effort to build up a great National Dental Museum and Library; second, that this Association recommend the appointment of Committees auxiliary to this National Committee by each of the local, State, and other Dental Societies in the United States; third, that the sum of one hundred dollars be appropriated, to be used with other donations, for the purpose of defraying necessary expenses of the National Committee.

Respectfully submitted,

WILLIAMS DONNALLY, *Chairman.*
H. J. MCKELLOPS.
HENRY W. MORGAN.
J. TAFT.

The following Committees were then called, but none were ready to report:

Committee to Consider the Mouth and Teeth as Related to Life Insurance; the Committee on Priority of Invention of the Electric Furnace; the Committee on the Union of the American and Southern Dental Associations; the Committee on State and Local Societies; the Committee on Necrology; the Committee on Revision of the Constitution.

The Executive Committee made a verbal report and offered the printed program, which was adopted.

The President then read his address; the First Vice-President, Dr. Fillebrown, in the chair.

On motion, it was referred to the following Committee: W. H. Morgan, C. A. Brackett, A. H. Fuller.

Committee on Credentials made a partial report, which was subsequently completed, as follows:

REPORT OF COMMITTEE ON CREDENTIALS.

Academy of Stomatology, Philadelphia, Pa.—Charles R. Jefferis.
Alabama Dental Association—R. A. Rush, John E. Frazier.
Chicago Dental Society—A. H. Peck, Louis Ottofy, J. N. Crouse, George H. Cushing, J. W. Wassall, A. W. Harlan, T. W. Brophy, N. D. Edmonds.
Cincinnati Academy of Dentistry—W. T. McLean.
Colorado State Dental Association—W. E. Griswold.
Delaware State Dental Society—C. R. Jefferis.
Delta Sigma Delta Fraternity—A. H. Peck, Louis Ottofy.
First District Dental Society of the State of New York—John I. Hart.
Illinois State Dental Society—Louis Ottofy, J. N. Crouse, A. W. Harlan, J. W. Wassall, George H. Cushing, T. W. Brophy, A. H. Peck.
Kansas State Dental Association—A. W. Davis.
Kentucky State Dental Society—E. M. Kettig.
Maryland State Dental Association—H. G. Ulrich.
Michigan Dental Association—H. T. Harvey.
Missouri Dental College—A. H. Fuller.
Nebraska State Dental Society—George S. Nason.
New York College of Dentistry—J. Bond Littig.
Odontological Association of Pennsylvania—Joseph Head.
Odontological Society of Pennsylvania—Alonzo Boice.
Odontological Society of Chicago—J. W. Wassall.
Ohio State Dental Society—F. C. Kemple, A. O. Ross.
Pennsylvania College of Dental Surgery—C. N. Peirce.
Pennsylvania State Dental Society—E. Slegel.
Philadelphia Dental College—L. Greenbaum, Thomas C. Stellwagen.
Pittsburg Dental Society—J. G. Templeton.
Southern Dental Association—Henry W. Morgan, T. M. Allen, W. H. Richards, S. W. Foster.
Vanderbilt University, Department of Dentistry—Henry W. Morgan.
Vermont State Dental Society—E. E. McGovern.
Virginia State Dental Association—J. Hall Moore.
Washington City Dental Society—R. W. Talbott, Williams Donnally, M. F. Finley, H. B. Noble.
Wisconsin State Dental Society—B. G. Maercklein.

Dr. W. P. Horton announced that he would exhibit an electric obtunding apparatus at Dr. Rich's office.

Dr. Bogue read a brief paper describing an appliance for restoring a lower jaw; also one for restoration of the upper half of the humerus, and exhibited models of the appliances.

Adjourned to 7.30 P.M.

FIRST DAY—EVENING SESSION.

The Association was called to order at 8 P.M., the President in the chair.

The minutes of the morning session were read and approved.

The report of the Committee on the President's Address was read and adopted.

The Treasurer was instructed to pay all properly authenticated bills.

Dr. Abbott, Chairman of Committee on Life Insurance, asked for further time.

Section III was called, but was not ready to report.

Section IV was called, but had nothing to offer.

Section V being called, Dr. Cassidy, the Chairman, read the report, and announced a paper by Dr. L. P. Bethel, and one by Dr. J. W. Wassall.

Dr. Bethel then read his paper, entitled "Lining Root-Canals."

These two papers were discussed by Drs. Abbott, Barber, Ambler, Stephan, B. Holly Smith, Head, Truman, Rhein, Taft, Fillebrown, Stellwagen, Harlan, and Patterson.

On motion, the subject was passed, and the Association adjourned till 9 A.M. to-morrow.

SECOND DAY—MORNING SESSION.

The Association was called to order by the President at 9 A.M.

The minutes of the evening session were read and approved.

There being nothing offered under the head of Miscellaneous Business, Dr. Wassall read his paper, entitled "The Disinfection of Pulpless Teeth."

Discussed by Drs. Abbott, Patterson, W. H. Morgan, Barrett, and Rhein. The discussion was closed by Dr. Wassall.

The following Committee was appointed to examine the books of the Dental Protective Association: J. D. Patterson, of Kansas City; J. S. Hurlbut, of Springfield, Mass.; S. G. Perry, of New York; W. N. Morrison, of St. Louis, and W. H. Richards, of Knoxville, Tenn.

On motion, 8 o'clock P.M. was set for Dr. Crouse to make a statement regarding the work of the Dental Protective Association.

Section VI was called, and the Chairman, Dr. J. D. Patterson, read the report, upon which there was no discussion.

Section VII being called, the Chairman, Dr. Brophy, reported two papers, one by Dr. Barrett and one by Dr. Fillebrown.

Dr. Barrett then read his paper, entitled, "The Orbicularis Oris," and was followed by Dr. Fillebrown, whose paper was entitled "A Study of the Relation of the Frontal Sinus to the Antrum."

Both papers were discussed by Drs. A. O. Hunt and Corydon Palmer.

The hour for the organization of Sections having arrived, they were organized as follows:

ORGANIZATION OF SECTIONS.

SECTION I. Prosthetic Dentistry, Metallurgy, and Chemistry.—A. O. Hunt, chairman; A. Boice, secretary; Grant Molyneaux, George H. Wilson, W. Storer How, A. J. Brown, Louis C. LeRoy, C. H. Harroun, N. D. Edmonds, W. T. McLean, S. E. Gilbert, L. C. Taylor, E. S. Gaylord, W. H.

Fundenberg, George M. Whitfield, V. H. Jackson, E. S Holmes, A. N. Roussel, H. G. Ulrich, Howard S. Seip, W. H. Baird, S. W. Foster, Charles A. Meeker, J. M. Ayer, George E. Adams, Oscar Adelberg, S. B. Brown, Boyd H. Baker, George C. Brown, G. V. Black, C. S. Case, Henry S. Colding, C. C. Carroll, George Evans, H. H. Jackson, J. Rollo Knapp, H. H. Keith, H. S. Sutphin, V. S. Jones, B. F. Luckey, Henry McManus.

SECTION II. Dental Education, Literature, and Nomenclature.—Louis Ottofy, chairman; S. H. Guilford, secretary; C. N. Peirce, H. W. Morgan, J. Taft, Thomas E. Weeks, M. F. Finley, J. Hall Moore, Charles P. Pruyn, Henry Barnes, S. E. Gilbert, S. Freeman, L. C. Taylor, L. Ashley Faught, J. L. Williams, Eugene H. Smith, T. M. Allen, A. H. Thompson, A. N. Roussel, William Conrad, C. R. Butler, S. W. Foster, C L. Goddard, C. J. Essig, E. M. Kettig, S. B. Brown, J. Adams Bishop, E. A. Bogue, L. L. Barber, H. H. Boswell, G. V. Black, C. D. Cook, L. L. Dunbar, C. E. Esterly, George L. Field, J. N. Farrar, George J. Friedrichs, Joseph Head, C. W. F. Holbrook, D. M. Hitch, C. S. Hardy, Frank Holland, Robert Huey, C. R. Jefferis, E. C. Kirk, W. H. Morgan, B. G. Maercklein, Theo. Menges, F. J. Maynard, A. E. Mascort, James McManus, H. J. McKellops, Daniel N. McQuillen, H. B. McFadden, H. B. Noble, A. L. Northrop, Edmund Noyes, J. B. Newby, George S. Nason, Francis Peabody, F. A. Remington, C. B. Rohland, W. E. Richardson, F. Edsall Riley, W. P. Richards, W. H. Richards, R. A. Rush, L. D. Shepard, C S. Stockton, E. D. Swain, B. Q Stevens, M. B. Straight, B. Holly Smith, C. W. Stainton, A. P. Southwick, H. T. Smith, J. F. Stephan, D. D. Smith, Thomas C. Stellwagen, Charles K. Van Vleck, I. N. Van De Water, W. W. Walker, J. L. Wolf, George W. Warren, W. Woolsey, George M. Whitfield, W. A. White, H. Newton Young, E. M. Zell.

SECTION III. Operative Dentistry.—S. C. G. Watkins, chairman; H. L. Ambler, secretary; J. Taft, G. W. Hoysradt, J. N. Crouse, W. N. Morrison, Louis C. LeRoy, A. H. Fuller, T. S. Waters, A. J. Brown, R. N. Kesterson, J. Hall Moore, A. O. Ross, M. B. Culver, A. N. Priest, Corydon Palmer, W. W. Shryock, Henry Barnes, S. B. Palmer, S. E. Gilbert, L. C. Taylor, S. G. Perry, Harvey Iredell, W. E. Page, W. H. Fundenberg, W. F. Fundenberg, C. N. Johnson, S. A. Freeman, B. Q. Stevens, H. T. Harvey, John I. Hart, W. St. George Elliott, P. J. Wilson, A. N. Roussel, Earl P. Hawes, Louis Jack, O. S. Watrous, H. G. Ulrich, P. S. Bollinger, G. W. Cochran, William Conrad, C. R. Butler, A. R. Starr, J. S. Hurlbut, F. C. Kemple, Edward M. Kettig, J. Adams Bishop, E. A. Bogue, L. L. Barber, H. H. Boswell, H. J. Burkhart, F. C. Barlow, E. Parmly Brown, E. M. Beesley, W. G. Browne, C. S. Butler, M. L. Chaim, C. D. Cook, Dwight M. Clapp, W. R. Clifton, C. C. Chittenden, George F. Cheney, W. G. Chase, William Crenshaw, L. M. Cowardin, J. H. Coyle, J. L. Crater, N. M. Chitterling, William H. Cogan, Isaac N. Carr, J. W. Canaday, I. B. Davenport, E. T. Darby, Charles E. Dunn, L. L. Dunbar, T. S. Hacker, T. T. Hayward, H. F. Harvey, Joseph Head, Frank Holland, Robert Huey, Meta T. Haley, W. E. Harper, C. W. Hoblitzell, C. S. Inglis,

C. R. Jefferis, Victor S. Jones, W. T. Jackman, G. E. Johnson, H R. Jewett, Daniel A. Jones, S. E. Knowles, D. E. Kelley, J. Rollo Knapp, B. F. Luckey, H. C. Miller, F. T. Murlless, Henry McManus, Daniel N. McQuillen, H. B. McFadden, P. A. MacLean, M. B. Straight, A. H. Sibley, Marvin E. Smith, E. A. Stebbins, R. M. Sanger, Charles Sill, B. Holly Smith, D. D. Smith, H. S. Sutphin, Nelson T. Shields, G. Marshall Smith, Z. Viola Swift, F. A. Shotwell, H. H. Sisson, A. W. Sweeny, W. C. Speakman, James McManus.

SECTION IV. Histology and Microscopy.—Frank Abbott, chairman; I. P. Wilson, secretary; L. L. Davis, F. C. Kemple, Thomas P. Hinman, Frederick Hindsley, J. E. Hinkins, Henry A. Hull, E. Slegel.

SECTION V. Materia Medica and Therapeutics.—J. S. Cassidy, chairman; L. P. Bethel, secretary; A. W. Harlan, Leo Greenbaum, A. H. Peck, J. W. Wassall, N. S, Hoff, L. C. LeRoy, James Truman, Wilbur F. Litch, M. W. Foster, A. R. Starr, S. W. Foster, B. Douglass, S. B. Dewey, Jessie B. Dillon, L. L Dunbar, A. W. Davis, A. H. Gilson, S. L. Goldsmith, J. P. Gray, O. J. Gross, E. C. Kirk, J. F. Lummis, H. S. Sutphin.

SECTION VI. Physiology and Etiology.—J. D. Patterson, chairman; L. E. Custer, secretary; W. C. Barrett, M. L. Rhein, Thomas Fillebrown, H. A. Smith, Emma Eames Chase, L. Ashley Faught, H. T. Harvey, G. V. Black, Arthur B. Freeman, I. P. Wilson, John E. Frazier, F. H. Gardiner, J. Howard Gaskill.

SECTION VII. Anatomy, Pathology, and Surgery.—W. C. Barrett, chairman; Thomas Fillebrown, secretary; L. P. Bethel, M. L. Rhein, W. P. Horton, J. W. Wassall, J. Y. Crawford, T. W. Brophy, W. T. McLean, R. J. Hart, S. Freeman, M. H. Cryer, H. T. Harvey, Norman J. Roberts, G. V. Black, G. L. Curtis, T. L. Gilmer, W. E. Griswold, N. J. Goodwin, Frank G. Gregory, John S. Marshall, C. A. Brackett, William C. Speakman.

Adjourned to 7.30 P.M.

SECOND DAY—EVENING SESSION.

The Association was called to order at 8 P.M., the President in the chair.

The minutes of the morning session were read and approved.

Under Miscellaneous Business, the Executive Committee offered the following report, which was adopted:

The Executive Committee would report upon the subjects referred to them as follows:

The communication from the Publication Committee was duly considered, and they unanimously recommend that the Transactions be again placed in the hands of The S. S. White Dental Manufacturing Company for publication, with the distinct understanding that they shall be issued to the members of the Association at a date not later than February 1, 1897.

With reference to the request of the Committee on National Museum and Library for funds, we recommend that a sum not exceeding one hundred dollars be appropriated, and the Treasurer be and is hereby authorized to pay it on the presentation of attested vouchers for the same.

The bill from the widow of Dr. J. J. R. Patrick was carefully considered, and the Committee recommend that in view of the fact that three hundred dollars had been paid Dr. Patrick from this Association and several sums from other sources, for which no credit in the account seems to have been given, the sum claimed be not paid, and that a communication be forwarded to Mrs. Patrick setting forth these facts and our conclusions.

We recommend that the bill from The S. S. White Dental Manufacturing Company for $95.58 be paid on its indorsement by the Auditing Committee.

On motion, it was further unanimously resolved that the Committee recommend that in view of the increased duties of the Recording Secretary and his long and very efficient services, the salary of the present incumbent be for the coming year three hundred dollars; this to enable him to procure such assistance as he may deem desirable.

The Executive Committee recommend that within twenty days after the Transactions have been received by the members of the Association the officers of the several Sections shall notify the Recording Secretary of their acceptance of the positions and of the names of members of their special Section, and that sixty days thereafter the President or Secretary of the Section shall send to the Recording Secretary of the Association, as far as possible, the titles of papers and the prospective work they shall have to offer at the stated sessions of the Association.

C. N. PEIRCE, *Secretary.*

The report of the Committee on Priority of Invention of Electric Ovens was read by Dr. Molyneaux, as follows, and was adopted:

SARATOGA SPRINGS, August 5, 1896.

Your Committee appointed to investigate the claims respectively of Drs. Custer and Taggart as to the priority of the invention of an electric oven for fusing porcelain, would respectfully submit the following report:

After a careful and impartial investigation of all the evidence obtainable, we find that the first practical and public demonstration of the electric oven for fusing porcelain crowns and continuous-gum dentures occurred in the office of Dr. L. P. Haskell in the month of October, 1894; Dr. L. E. Custer using an electric oven of his own invention and construction, did then and there fuse a practical case for Dr. Haskell. Furthermore, we find that Dr. Custer did fuse porcelain by electricity early in the year 1889, while con-

ducting some experiments with an electric gold annealer, thereby antedating any previous record on this subject.

The Committee believe that Dr. L. E. Custer was the first one to practically fuse porcelain in an electric oven, and recommend that this Association accord him that honor.

Signed, FRANK HOLLAND,
J. BOND LITTIG,
G. MOLYNEAUX.

Dr. Crouse then gave a statement of the condition of litigation in the matter of the Dental Protective Association.

The discussion of Dr. Fillebrown's paper was then continued by Drs. Brophy, B. Holly Smith, and Barrett.

Dr. Ambler read a paper entitled "Nodule on Apex of Root."

Dr. W. N. Morrison reported his success in replantation and in orthodontia.

Dr. Fillebrown closed the discussion.

Dr. W. H. Richards, of Knoxville, Tenn., then gave a lecture on the "Morphology of the Dental Pulp," illustrated.

Adjourned to meet at 9 A.M. to-morrow.

THIRD DAY—MORNING SESSION.

The Association was called to order at 9.30, the President in the chair.

The minutes of last evening's session were read and approved.

Under the head of Miscellaneous Business, Dr. Harlan called attention to the failure to appoint members to deliver annual addresses.

Dr. Crouse moved that the chair appoint the Committee on State and Local Societies. Carried.

Dr. Fillebrown read the report of the Committee on Union of the American and Southern Dental Associations, as follows :

REPORT OF COMMITTEE ON UNION OF AMERICAN DENTAL ASSOCIATION AND SOUTHERN DENTAL ASSOCIATION.

To the American Dental Association:

Your Committee appointed to consider the union of the American Dental Association and the Southern Dental Association, continued from last year, offer the following report:

As the next meeting of the Southern Dental Association after the appointment of this Committee was not held until after the last annual meeting of the American Dental Association, it was impossible to have any correspondence on the subject or take any action in the matter during the year 1894-95.

At a meeting of the Southern Association, held in Atlanta, October, 1895, a Committee was appointed, consisting of Dr. L. G. Noel, Tennessee; Dr. E. P. Beadles, Virginia; Dr. J. T. Calvert, South Carolina; Dr. J. Rollo Knapp, Louisiana, and Dr. F. Peabody, Kentucky, to respond to the invitation of the American Dental Association. The Committees have had considerable correspondence during the year, and report the following communication from the Secretary of the Southern Association:

"SARATOGA, August 5, 1896.

"The report of Committee from the Southern Dental Association to confer with Committee from the American relative to union of the two societies was to the effect that the committees had been unable to come together; and as the result of correspondence it was advised that an effort be made to have both societies hold their next meeting at the same time and place, that the Committees might confer and the Associations dispose of the matter finally.

"The Association voted to offer the following suggestion to the Committees, with instructions to make a final report to this society at its next meeting. It would meet the approval of the Southern Dental Association if the American would meet at Old Point Comfort the first Tuesday in August, 1897, the same time and place that the Southern convenes.

"Committee from the Southern Dental Association:

"L. G. NOEL,
"E. P. BEADLES,
"J. T. CALVERT,
"J. ROLLO KNAPP,
"FRANCIS PEABODY.
"By S. W. FOSTER, *Secretary.*"

Your Committee recommend the acceptance of the suggestion of the Southern Dental Association as to place of meeting, and also that the Committee of the American Dental Association be continued another year.

THOMAS FILLEBROWN,
J. N. CROUSE,
J. Y. CRAWFORD,
B. HOLLY SMITH.

Dr. Morgan moved to adopt the report so far as it does not conflict with the Constitution and By-Laws, or with the program of this session. Carried.

The Committee on the Revision of the Constitution made a brief verbal report, and the Committee was continued.

Section I was called, and Dr. Boice stated that the Section had nothing to offer.

Section II being called, Dr. Ottofy, Chairman, read the report, which was accepted and referred to the Publication Committee.

Dr. Guilford then read his report on Nomenclature.

He also read a paper by Dr. A. H. Thompson, of Topeka, Kansas.

These papers were discussed by Drs. W. C. Barrett, J. Taft, Stellwagen, and Guilford.

On motion, the report was adopted.

Section III had no report to make, no paper having been offered.

The following Committee on National Dental Museum and Library was appointed:

Williams Donnally, Jonathan Taft, H. J. McKellops, Henry W. Morgan, and Thomas Fillebrown.

Dr. Crouse moved to make the special order at 5 P.M. the selection of the place of next meeting, and the election of officers. Carried.

The following communication was presented:

The Executive Committee nominate, with the consent and acceptance of the nominees, the following to read essays before the Association in 1897: Dr. A. W. Harlan, of Chicago; subject, "Miasms and Infection."

Dr. J. S. Cassidy, of Covington, Ky.; subject, "The Relation of Chemistry to Dentistry."

The following Committee on State and Local Societies was appointed: J. N. Crouse, L. P. Bethel, and A. W. Harlan.

Dr. H. W. Morgan was appointed on the Committee on Nomenclature.

The following was presented and ordered to be published :

SARATOGA SPRINGS, August 6, 1896.

To the Second Division of the Executive Committee on Ethics:

GENTLEMEN :

We, the undersigned, hereby charge Dr. W. P. Horton, of Cleveland, a permanent member of this Association, with violation of the Code of Ethics of this Association, as follows :

In that he is engaged in the selling of licenses and rights to use certain secret preparations and methods for the obtunding of sensitive dentine, a practice contrary to the letter and spirit of the Code of our liberal profession.

J. TAFT,
C. N. PEIRCE,
A. W. HARLAN,
J. D. PATTERSON,
H. J. MCKELLOPS,
L. L. BARBER,
G. MOLYNEAUX.

Dr. Taft, Chairman of the Committee on Necrology, asked consent to prepare his report after adjournment, to be forwarded to the Publication Committee. Consent was granted.

The report will be found on the memorial pages.

Dr. Corydon Palmer then addressed the Association.

On motion, the thanks of the Association were extended to Dr. Palmer.

Adjourned to meet at 5 P.M.

THIRD DAY—AFTERNOON SESSION.

The Association was called to order at 5 P.M., the President in the chair.

The minutes of the morning session were read and approved.

The special order, the selection of the place of next meeting, was

then called, and the Executive Committee in making the nominations presented the following:

The Executive Committee, making nominations for the place of meeting, would report that Dr. Griswold, of Denver, has been sent to this Association for the purpose of extending an invitation from seventy dentists, the hotels, Chamber of Commerce, Mayor of the town, Governor of the State, business men of the town, and railroads, to have the Association meet there in 1897. Old Point Comfort, Washington City, D. C., and Niagara Falls have also been suggested and nominated by the Committee.

C. N. PEIRCE, *Secretary.*

San Francisco was also nominated.

Old Point Comfort was chosen.

The election of officers was then proceeded with.

On motion, it was ordered that the first ballot should be an informal or nominating ballot. If upon the second ballot there should be no choice, all names but the highest three should be dropped, and at each subsequent ballot the name having the smallest number of votes should be dropped; this rule to apply to the votes for all the officers.

The result of the balloting was as follows:

President—James Truman, of Philadelphia.
First Vice-President—Thomas Fillebrown, of Boston.
Second Vice-President—W. R. Clifton, of Waco, Texas.
Recording Secretary—George H. Cushing, of Chicago.
Corresponding Secretary—Emma Eames Chase, of St. Louis.
Executive Committee—S. G. Perry, W. W. Walker, and A. O. Hunt.

On motion, the following was adopted:

Resolved, That the Recording Secretary have printed a list of the members, with their addresses, also a list of the members of Sections, said lists to be forwarded to each member on or before November 1, 1896.

A vote of thanks was returned to the hotels for reduced rates.

The minutes were read and approved.

Drs. Richards and Gaylord were appointed to conduct the newly-elected President to the chair, who was introduced by the retiring President as follows:

REMARKS OF THE RETIRING PRESIDENT, DR. CRAWFORD.

GENTLEMEN OF THE AMERICAN DENTAL ASSOCIATION: Permit me to return to you my sincere thanks for the uniform courtesy and confidence which you have extended to me during the last two years of your history. It now affords me pleasure to welcome to this platform a gentleman so distinguished in the learning of our profession and in all its collateral sciences, and also as a teacher, an educator, and a citizen of high rank, whose age, experience, grace, and dignity will enable him, I have no doubt, to preside over the deliberations of this body much better than has the gentleman whom he is succeeding.

Dr. Truman, upon assuming the chair, addressed the Association as follows:

HONORED RETIRING PRESIDENT, AND GENTLEMEN OF THE AMERICAN DENTAL ASSOCIATION: Permit me to thank you most sincerely for this high honor, entirely unexpected by me when I entered the hall in the earlier portion of this week. I am satisfied that my selection was accomplished without any political influence; and as I hold, and have ever held, that the place must seek the man and not the man the place, I accept it with satisfaction and with thanks.

Now, it appears to me that there is something to be done by this American Dental Association to overcome the apathy which seems to hang like a cloud over it, and which has apparently covered it for several years past. We all love this body. We want to see it energetic. We want that it should move on in proper lines and toward higher things, and the only way to accomplish this is through untiring efforts.

When we met last year at Asbury Park, it seemed to me there was a defect in the system adopted by this body. We had a large number of papers read by title This is always discouraging to the writer, and what has been the result? We have had a paucity of papers this year; and while to me the earlier sessions of this meeting were the most satisfactory, I, think, of any that I have recently attended, I cannot so regard the latter part, for the reason that both the mechanical and operative branches were almost entirely ignored. Now, we have many men of many minds in our Association, and we must cater to all conditions and to all shades of thought. Therefore I do hope that during the next year, and in the very early part of the year, there will be an effort made to infuse new life into the Association, and I know that this can be done. For my own part, I cannot be at the head of any organization standing still or that seems to be in a dying condition. I will not, because I know by proper effort any association

can be maintained, an honor to the profession it represents, by energetic action on the part of its members. I am satisfied that when we meet next year at Old Point Comfort the hope of many years of my later life will be accomplished; that we shall join hand in hand with our Southern brethren, and come up as one body to carry on this great work in the future.

The Chair appointed as the local Committee of Arrangements J. Hall Moore and T. H. Parramore. The Publication Committee was appointed as follows: E. T. Darby and A. W. Harlan.

The minutes were then read and approved, and the Association adjourned to meet at Old Point Comfort the first Tuesday in August, 1897.

GEORGE H. CUSHING, *Secretary.*

REPORT ON NECROLOGY.

DR. W. H. DWINELLE.

It is with a keen sense of the influences important and efficient in elevating and establishing on a firm professional basis the position of the dental practitioner that we place on record the death of our late valuable member, William H. Dwinelle, A.M., M.D., D.D.S.

Dr. Dwinelle was a co-worker with Dr. Chapin A. Harris in establishing the *American Journal of Dental Science* and the Baltimore College of Dental Surgery. His labor was continuously for the elevation of dentistry. Though most prolific in the invention of valuable methods and appliances, he positively refused to have anything patented, believing it would be derogatory to the character of a professional man. His broad education, his appreciative perception of merit, his generous and noble impulses, made him a valuable and highly-prized member of a number of societies for the promotion of science, and for pleasure and social improvement. As early as 1850 he was an enthusiastic worker with the microscope, and called around him many friends who, through his influence, recognized the value of this instrument in the study of medicine, surgery, and dentistry. In dental technic he was eminently successful and artistic. Whether as draughtsman, engraver, sculptor, or designer, his esthetic sense and taste were ever in the ascendency. His keen perceptions made him ready in efficient remedies, and his deftness made him skillful in surgery, as several monographs will testify. For over fifty years he practiced dentistry, and during that time he was honored as few have been, deferential attention being always paid to his words of counsel. His tenacious memory, his ready wit and humor, and charming conversational powers made him the delight of a coterie of friends.

Dr. Dwinelle was born July 22, 1819, and died February 13, 1896. The family homestead was in Cazenovia, N. Y. He was the son of

Judge Justin Dwinelle, of old New England stock, and of French and English ancestry.

P. G. C. HUNT, D.D.S.

Since the last annual meeting of this body it has pleased the All-wise disposer of events to take from this life our professional brother and co laborer, Dr. Phineas G. C. Hunt, of Indianapolis, Ind. His age was sixty-eight years.

Dr. Hunt at the age of eighteen took up the study of dentistry, and two years later entered upon its practice, 1848. Dr. Hunt entered the practice well equipped in the attainments for that period. He had for years before this been a persevering and industrious student, and when he came to the study of dentistry it was with special advantages, being under the tutorship of his brother, Dr. D. P. Hunt, who had been in practice for some time, and was a most excellent dentist and a very apt teacher.

The subject of this sketch was a young man of great energy, and a persevering student and investigator, and he rose rapidly to a high position. He early attained a standing with his professional brethren that was truly an enviable one, not only in his own State but throughout the country. He had a full and independent practice at the age of twenty-one. The professional career of Dr. Hunt extended over a period of forty years in one community, and was one of eminent success. It is not only for what he did in this direction that he is to be honored and loved, but more especially for what he did for his chosen profession. Directly, it may be said, he aided hundreds of his brethren in a professional way, and thousands have in some way or manner felt his helping influence. He was a person of magnetic presence, and was an inspiration to all who came into immediate personal contact with him. He had great resource, especially in the line of mechanics, and the results of his genius have gone out into the profession and have been utilized by thousands, while they have been ignorant of their origin. This fact well illustrates Dr. Hunt's modest and unostentatious manner. He never put forward his own ability, only as it came out in his quiet manner of communicating the results of his own genius to others.

From the beginning of Association work he was in it an active participant. He was one of the organizers of this Association in 1859, and was ever an active, earnest worker in it. Dr. Hunt was

elected its President in 1872. His influence was acknowledged by every member. He is gone, but his work remains to bless the world.

The profession, and especially this Association, cannot well afford to lose such men as Dr. Hunt. His life was an inspiration to all who knew him. Then let us cherish his memory, and account ourselves happy that we are the possessors of the legacy he has left us, an inheritance not to be lightly esteemed.

J. TAFT,
FRANK ABBOTT,
C. N. PEIRCE,
LOUIS JACK,
H. J. MCKELLOPS,
Committee.

ANNUAL ADDRESS.

By J. Y. CRAWFORD, President.

GENTLEMEN OF THE AMERICAN DENTAL ASSOCIATION,—You will permit me to thank you for calling upon me a second time to preside over the deliberations of your honorable body. I can say that it was beyond my expectations, and certainly above my deserts, to be thus honored.

Notwithstanding the great financial depression and general agitation in our country, our profession has obtained considerable progress within the last twelve months, which it would be interesting and instructive at this time to relate and emphasize; but there are other matters which more directly affect the future welfare of our vocation and the good of the whole people that demand our attention. I desire to call your attention to the question of dental jurisprudence, or the legal enactments governing or regulating the practice of dental surgery in the United States.

First, I will say that any enactment placed upon the statute-books of our common country, or any of the independent States of our common country, should rest upon the immutable principle of equal and exact justice to all, with exclusive privileges to none.

Second. All laws that are intended to control the conduct of an individual or individuals in regard to any definite and universally uniform question in all the States should be absolutely the same in all particulars.

Third. All such laws should be so plain and simple in their construction that the humblest citizen can comprehend them, and, if necessary, administer the same in case he should be called upon so to do by the suffrages of the people.

Fourth. The penal features should be so well marked and imperative in demand that none would dare disregard except at their peril.

Upon this feature, more than any other, perhaps, depends the efficiency of all laws.

Fifth. Each State should have the same enactments controlling the matter of dental education, making the requirements for graduation uniform in every particular, thus holding dental colleges up to a higher and better standard.

Sixth. The first registration of an individual to practice should be made within twelve months after receiving a diploma from a regular dental institution of learning. The second or subsequent registrations in any other State of the Union should depend upon the presentation of a certificate from the State Board of Dental Examiners where the original registration was made that the individual held a diploma from a reputable dental college, and that he had engaged only in the *reputable* practice of dental surgery while remaining a citizen of the State.

Finally, the embodiment of the ideas just suggested, with other minor details, such as the regulation of fees and penalties and the designation of proper tribunals to have jurisdiction over the questions involved, should make up the sum total of all that is embraced in the subject of dental legislation in this or in any other country.

In order that this may be accomplished, I would respectfully suggest that this Association appoint a committee of one member from each State, and that the National Association of Dental Examiners be requested to appoint one member from each State, also the Dental College Faculty Association be requested to appoint one member from each State having a dental college or colleges, to be known as a general legislative committee, whose duty it shall be to formulate and draft such a uniform law as could not fail to be satisfactory to all the States, and that would result in the accomplishment of the most good possible—not only to the profession, but to the public at large. That said committee should be requested, through its representatives in the various States, to have this uniform law presented as nearly simultaneously in all the States as possible; and that this national organization, by resolution, unanimously request the hearty co-operation and support of the entire profession in the Union.

This work is of so much magnitude and fraught with so much interest to all departments of dental science and dental institutions in this country, that it cannot be accomplished within a short period of time. Hence this legislative committee should be selected with great

care, in order that friction and disputation over minor points will obtain as little as possible, since the caviling and contention by the profession over features of minor importance have been the greatest obstacle in the way of securing proper legislation to govern and regulate the practice of dentistry and medicine in this country.

It is certainly evident that unless something is done in the direction of strengthening the moral force of the laws governing the practice in many of the States, the effect of such enactments now upon our statute-books will become *nil* so far as the desired results are concerned.

Again, I would suggest that we, as a liberal profession, should encourage in all of our States the uniformity of such laws as have the same definite and legitimate object in view. . The common patriotism of any learned profession should be willing to do at least this much for the advancement and development of the proper fraternal feeling in all of the States, thus doing something in the line of obliterating all sectional lines and objectionable sectionalism. This uniformity of laws is one of the reasons that could be offered at this time for creating out of the two organizations that are now in existence—to wit, the American and the Southern Dental Associations—one national organization, to be known by such name as would be appropriate and proper, in carrying on this work of inducing all of the States to adopt a uniform code of laws regulating the practice of dental surgery. The interest and welfare of our institutions of learning in dental surgery imperatively demand this uniformity of laws. In fact, from a high philosophic standpoint, there can be no tangible reason why the States of this Union should not have laws upon all their statute-books exactly the same in every particular, governing individuals who are alike affected under all circumstances.

I would call your attention to this additional fact, in order to stimulate a discussion and action upon this important matter, that there are many citizens, good and reputable, now engaged in the practice of dental surgery—and general medicine, so far as that is concerned—in some States of this Union who are deprived of citizenship in other States by virtue of the improper construction and requirements of some of the laws in States of this Union, thus virtually disenfranchising them to a certain extent. I would insist especially that the laws governing dental education be so constructed that no college would be regarded as reputable and entitled to public confidence, or be authorized to issue a legal diploma, which habitually and know-

ingly admitted students or other persons who have been illegally engaged in the practice of dental surgery in any State.

In view of the interest manifested in the matter of uniting the two Dental Associations referred to, the Southern and the American, I would respectfully advise that our next meeting be held at Old Point Comfort, Virginia, at the usual time, as the Southern Dental Association has adjourned to meet at that time and place, suggesting also that it would be fully agreeable for them to have our Association do likewise, in order that, after a full, free, and frank discussion, the question of consolidation be finally and permanently settled. Further, I would suggest that in case the consolidation referred to cannot be accomplished, this Association hereafter hold its annual meetings in the three grand divisions of our great country,—to wit, the Northeast to have one meeting, the Northwest to have one meeting, and the South to have one meeting, thus alternating from year to year, in order that the whole profession throughout the entire country may have its full share and benefit resulting from our national organization.

Since our last meeting we have lost the following members by death :

Dr. W. H. Dwinelle, New York ; Dr. P. G. C. Hunt, Indiana ; Dr. C. W. Spalding, Missouri.

I would respectfully call special attention to the reports of your Committee on the work of the National Museum in connection with the Army Medical Museum at Washington. The progress in the work of your Committee seems to be satisfactory, and all that could be desired. As to their recommendation for an appropriation for this Association, I respectfully refer the whole matter to you as a body ; and I would further suggest that the full report of this Committee be published in our annual Proceedings, in order that as much information may be disseminated upon this subject as possible throughout the profession.

Again thanking you for your kind consideration and preferment, I promise my full share of devotion and interest in the further progress and development of our Association, and that, whatever my lot in life may be, I will always hold the preferments and distinctions that you have cast upon me, without my solicitation, the highest compliments of my life.

REPORT OF SPECIAL COMMITTEE ON THE PRESIDENT'S ADDRESS.

YOUR Committee, to whom was referred the able and eloquent Address of our President, would respectfully report as follows:

The subject of dental legislation, which is made a prominent feature in the Address, is one which we all regard as of the highest importance both to the people and to the profession, and we are cordially agreed that all laws should be framed with a view to affording strict justice to all.

None can appreciate more fully than do the members of your Committee the supreme importance of securing and maintaining high standards in all institutions of dental learning in our country. We also appreciate the great desirability of the enactment by all of the States of similar statutes regulating the practice of dentistry. The conveniences and advantages which would come through such legislation are many and various; but, while recognizing all these advantages, your Committee are so impressed with the differing conditions now existing in the different sections of our country that we doubt the practicability of securing absolutely uniform legislation in any large number of the States within the near future, and we also regretfully express doubt of the expediency of appointing at the present time a Committee to be charged with such undertaking.

Respectfully submitted,

W. H. MORGAN,
C. A. BRACKETT,
A. H. FULLER,
Committee.

VOLUNTARY ESSAY.

PROSTHESIS EXTRAORDINARY.

PAPER BY E. A. BOGUE.

IN 1893 Dr. Pean, of Paris, operated upon a sarcomatous tumor of the lower jaw, for a young girl twenty years of age, removing about six centimeters of the jaw. The operation was successful, but the patient was disfigured, as usual.

Discussing this deformity with Dr. Michaels, of Rue Royale, Paris, one of his dental friends, Dr. Michaels suggested the idea of restoring the jaw to its original length by the aid of a platinum and iridium bridge, screwed to the two fragments of the jaw-bone. Dr. Pean so approved of this project that he reopened the cicatrix two months after his operation, exposing the two ends of bone, and left the rest to Dr. Michaels. The latter screwed his bridge to place, restoring to the jaw the six centimeters which were lacking, inserted a few sutures, and the apparatus was inclosed in the soft tissues beneath the periosteum, and the deformity disappeared. Seven days after the operation the general condition was good, and reunion by first intention had taken place all along, except at one point at the angle of the jaw.

This apparatus was worn for several months, but the patient, being tuberculous, died later on.

Encouraged by the success of this undertaking, Dr. Pean asked Dr. Michaels if he could construct an apparatus to replace the upper portion of the humerus, with the joint, if resection of that portion of the bone were to be made. Dr. Michaels's answer was that he would try. After a few days he produced the apparatus which I hold in my hand.

An exact duplicate of this apparatus was constructed for Jules Pedoux, of Paris, a baker, twenty-seven years old, afflicted with

FIG. 1.

osseous necrosis, tubercular in character. A resection of the humerus for one-half its length was made, March 11, 1893, at the International Hospital, Rue de la Sante, by Dr. Pean.

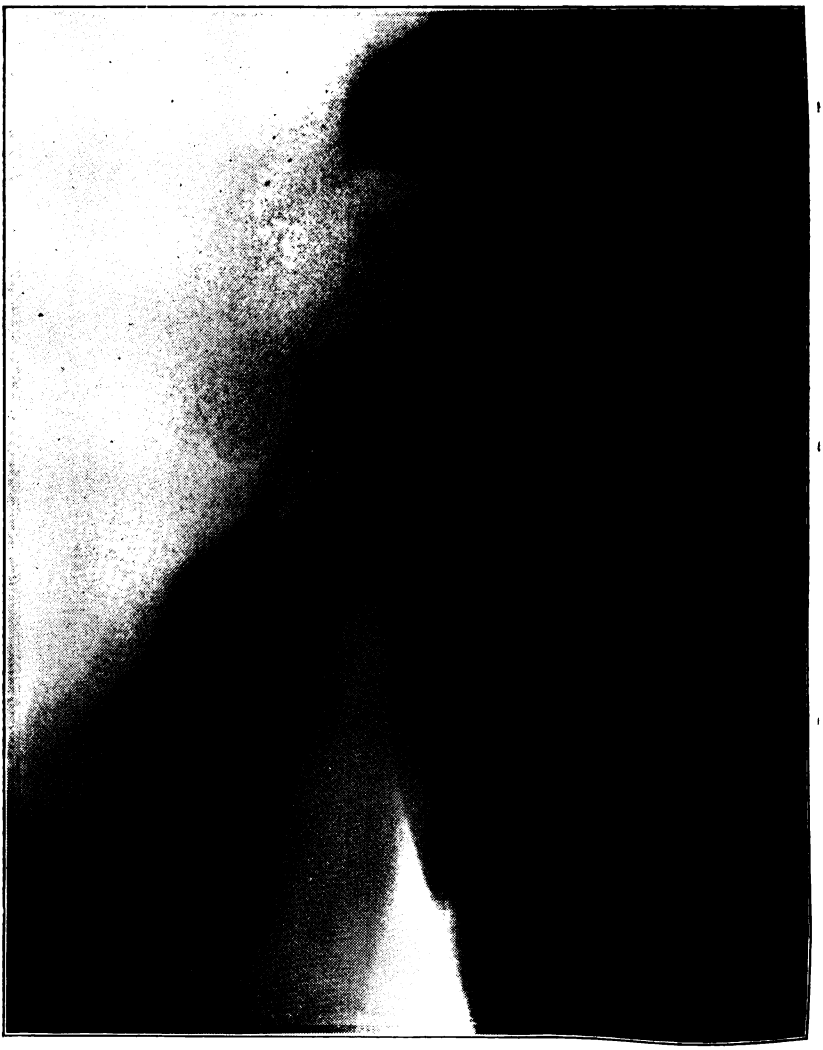
Immediately upon the completion of the resection this apparatus was screwed into place, the upper portion being attached to the

FIG. 2.

scapula, the lower portion to the humerus, with screws. Two loops held the capsular ligament in place. The apparatus is so constructed that the movements of the ball-and-socket joint of the shoulder, the

up and down, backward and forward pronation, supination, and rotation, are all possible.

FIG. 3.



The materials used in its construction are hard vulcanized rubber and platinum.

After one and a half years the patient brought refreshment to three of us who had gone to see him. He held bottles in his left hand, drawing the cork with his right, and waited upon the table with almost as much facility as any one. He subsequently stripped and exhibited to us his arm. There were two places where now and again a drop of pus oozed. His color was good; the cicatrix normal in appearance, except at these two points.

One year later the arm was again opened, as bone was believed to have formed along the inner side of the apparatus. This formation was found to be sufficiently firm to allow the platinum wires to be cut by heavy nippers; the screws attaching the apparatus above and below to be removed, when the whole thing was gently withdrawn from its bed beneath the periosteum. The arm was strapped to the breast for about six weeks, and in November last (1895) I pressed that arm with considerable vigor, the patient smiling in the mean time and telling me to press harder, as there was no pain or sensibility of any kind. There had been a re-formation of bone, and the joint is again in working order; the arm is shortened about one and one-half inches; the movements of the arm are somewhat abridged, but to all intents and purposes it performs its functions, the result being a good arm instead of an amputated one.

A few days since (July, 1896), an X-ray photograph was received from Dr. Michaels, showing the new formation of bone, and showing also where, and I think why, the shortening of the arm has occurred.

SECTION V.

MATERIA MEDICA AND THERAPEUTICS.

REPORT BY J. S. CASSIDY, CHAIRMAN.

THE process of cataphoresis has probably been the most interesting new feature in dental therapeutics introduced during the past year. Cataphoric medication, however, has been unconsciously practiced, to a limited extent, for several years, by what was supposed to be merely the effects of the electrolysis of certain drugs in the local treatment of alveolar pyorrhea and other septic conditions pertaining to the teeth.

At the clinics of the dental section of the International Medical Congress, at Washington, in 1887, Dr. W. V. B. Ames exhibited a simple electric appliance for developing active iodin, at the desired point, by the electrolysis of KI. At the same clinic, another gentleman, whose name the writer has forgotten, adopted similar means with a solution of NaCl to bleach darkened teeth. This statement is made merely with a view to the recognition of evolution in this phase of electro-therapeutics, and not for the purpose of diminishing the credit due to Professor Morton and others for introducing this new osmotic treatment.

The physiological benefits obtained, in the majority of cases, through cataphoresis, are accepted facts; but the phenomena involved in their production as yet remain unexplained.

Heretofore the effects of electric currents on compound liquids have been studied only in connection with electrolysis; and the questions might be asked:

Does cataphoresis ever occur free from electrolysis? Yes.

Does electrolysis, of an electrolyte in porous solid or semi-solid matter, always accompany cataphoresis?

To this I would answer No, as witness the passage of water in moistened clay toward the cathode, without suffering decomposition; and, conversely, the decomposition of KI in contact with gum-tissue, where no intromission of the freed iodin is apparent. This latter example seems to prove that at least one of the laws of ordinary electrolysis might be applied with advantage in many cases to our choice of drugs; for instance, those whose decomposition will supply its electro-positive radical as the active agent will penetrate more deeply; otherwise, as in the case of KI, the electro-negative radical I will not be drawn or pushed cataphorically toward the negative pole: but when free iodin in aqueous solution is used, it acts most charmingly, owing to the carrying power of the water, absence of chemical action, and consequent non-interference with its passage by a more highly electro-positive radical. The extra energy noticed in bleaching, of electro-negative O developed by this process from aqueous pyrozone, may be accounted for by its greatly increased volume and pressure, due to the electrolysis.

Electro-negative radicals are attracted toward the anode and the positive radicals to the cathode, probably somewhat according to the following arrangement of KI:

Dr. L. P. Bethel has reported, recently, successful applications of this method in introducing solution of $AgNO_3$ into root-canals; the canal in each instance, although too small for any broach to enter, was completely permeated. This statement is not surprising, however, if we consider the nature of the substance. It decomposes into basic and acid radicals by contact with organic matter, even when applied topically; it is a good electrolyte; and, therefore, the influence of the electric current causes further progression of the basic radical Ag_2O than would occur did separation not take place. The silver oxid deposits as an insoluble, black, inert residue, and the acid radical of the salt escapes with water as nitric acid:

$$2AgNO_3=Ag_2O+N_2O_5.$$
$$N_2O_5+H_2O=2HNO_3.$$

One other rule of electrolysis may be alluded to in this connection, namely, "decomposition of an electrolyte is in the ratio of its chemical equivalent." Accordingly, 9 parts by weight of H_2O, 98 of H_2SO_4, and 166 of KI will react simultaneously by the influence of the same current.

This rule may enable some one to construct a list of—may I venture to name them?—"*Cataphoretics*," by combining in certain proportions a too active conductor with a less active one, as in the case of cocain hydrochlorid and guaiacol.

Objections have been made to the use of sulfuric acid by this method, on account of its loss of power by electrolysis. This, however, is not practically true, for although it decomposes into free H and sulfione, it is again reconstructed at the expense of the water present, enabling the nascent molecule to attack the dentine with more than usual energy, at the same time setting O free.

$$H_2SO_4=H_2+SO_4$$
$$SO_4+OH_2=H_2SO_4+O.$$

A liquid conductor, more or less above zero, seems to be essential to this process, and different preparations of the same active principle are indicated for the variations in treatment. As is already well known, the action of cocain hydrochlorid is more effective in reducing the sensibility of dentine, if it be retarded by a non-conductor, such as some of the phenols, of which guaiacol, thus far, is preferred. But when using this salt as a local anesthetic for soft tissues, a strong aqueous solution would be my own preference.

Dr. Custer uses blotting-paper, saturated with the solution, and of a size corresponding to the area to be anesthetized; he places the pad in position, a silver coin is then interposed between it and the anode, and the current turned on. For soft tissues both voltage and amperage may be increased above that indicated for sensitive dentine, without producing any unpleasant effects.

In preparing for extracting teeth, a forked anode, adjusted by a ball-and-socket joint, should be used, one prong placed in the cavity of decay, if there be such, with cocain held by cotton wool, and the other point placed well up on the gum in the manner described by Dr. Custer. Dr. Custer further writes: "I am satisfied on the following: cocain, cataphorically applied on the mucous membrane and upon the cuticle as well, is almost, if not quite, as effective as a hypodermatic injection. It also possesses these advantages:

"First. The application itself, if properly conducted, is painless.

"Second. There is less danger, because the drug is diffused, and it is not possible for the full dose to enter into the venous circulation, as may happen when administered by the syringe. (I believe all the cases of sudden collapse by injection are due to the dose being injected into a vein and thereby carried, undiluted, to the heart and medulla reflexly.) It is when the cocain is mostly entered into the arteries that the anesthesia is best and the danger least.

"Third. The danger of septic inoculation is overcome."

A few weeks ago the attention of the writer was called to the decided acid reaction produced by cataphoresis of cocain hydrochlorid on sensitive dentine. This reaction is due to electrolysis of the salt, the alkaloid proceeding in search of its beloved cathode, while the acid HCl remains at the surface near its own favorite anode. At first this condition suggested the presence of an enemy, but later experiments proved that the relatively small quantity of acid developed can be of no serious consequence to the dentine.

A new remedy has recently made its appearance, bearing the name of eucain, which will probably soon claim a large share of the honors hitherto belonging to cocain, as a local anesthetic. It is an artificial alkaloid, said to be produced by the reaction between, principally, acetone (dimethyl ketone, CH_3COCH_3) and ammonia. The favorite salt is, like that of cocain, the hydrochlorid, which, evaporated from aqueous solution, retains one molecule of water of crystallization, $C_{19}H_{27}NO_4HClH_2O$. Eucain hydrochlorid presents the appearance of a white, odorless, crystalline powder, of a bitter quinin-like taste, soluble in water, alcohol, and chloroform. It induces some hyperemia of the mucosæ, rather than anemia, when applied locally, but, nevertheless, it causes well-marked loss of sensibility. As a "cataphoretic" obtundent of dentine it seems to act favorably, although more experiments will have to be made with it before its virtues in this direction are accepted as satisfactory. From the literature accompanying the sample sent me I learn that eucain is less poisonous than cocain, although their dosages are approximately the same; that lethal doses cause excitation of the central nervous system, convulsions affecting all the muscles, general paralysis, and, finally, death of the animal by respiratory failure. For producing local anesthesia by hypodermatic injection it is advised to make a solution of one part of eucain hydrochlorid to ten parts of sterilized water. Such a solution, it is claimed, remains permanently unchanged

and can be boiled without causing decomposition. In this particular, at least, it has a decided advantage over cocain; it is probably uniform in its action, other conditions being equal, on account of its immediate derivation from pure chemicals, instead of indirectly from vegetable sources. The claim is made, further, that no evil effects have thus far been reported as sequelæ of hypodermatic injection for the removal of teeth, although the anesthesia, in point of duration and intensity, was fully as satisfactory as that produced by cocain.

While acknowledging that there must be differences in degrees of danger by the use, and sometimes abuse, of different drugs, introduced by the needle, the evidence of experience proves that unpleasant consequences may follow such an operation, even when the most innocent of all substances be the only one employed.

SECTION V.—Continued.

Lining Root-Canals.

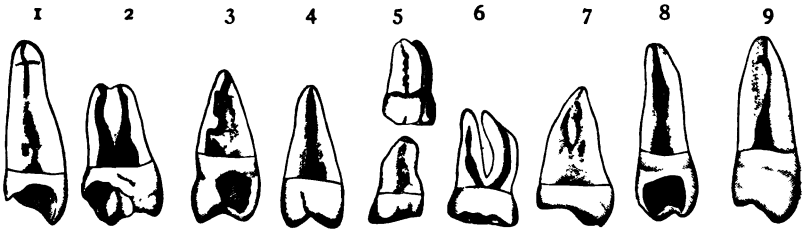
By L. P. BETHEL, of the Section.

IN the treatment of teeth with devitalized pulps, a medicament that not only sterilizes the contents of the root-canal, but leaves behind an antiseptic deposit which prevents the subsequent development of micro-organisms, would be an ideal disinfectant.

With this thought in mind I began a series of experiments, some months ago, taking nitrate of silver for the first agent. We know how useful this salt has been in the treatment of certain superficial cavities in the teeth of adults and various cavities in the teeth of children, preventing further decay as long as the discoloration remains. If in this location, where it is exposed to the varying conditions of the oral fluids, it will prevent subsequent decay for a considerable time, why should it not remain unchanged for a much longer period when sealed within a root-canal, and perhaps remain as a permanent barrier to the development of bacteria?

How to get the silver nitrate to permeate the canal so as to coat it thoroughly from pulp-cavity to apex of the root was a question of first importance. Repeated attempts at pumping it into the canal by means of wooden points, broaches, etc., proved unsatisfactory, for the silver-nitrate solution would not go beyond the point of penetration of the broach, and the cases most desired to treat were the small, branching, or tortuous canals, where it was impossible to pass even a broach. By the aid of cataphoresis, however, the silver

nitrate was forced beyond where the broach extended, into small canals, etc., as shown by the specimens here presented.



1. Operated on in the mouth with 50 per cent. solution silver nitrate. Crown cavity protected from discoloration by a thin coating of melted wax.

2. Operated on in the mouth with 75 per cent. solution silver nitrate. Crown cavity protected with wax.

3. Operated on in the mouth with 75 per cent. solution silver nitrate.

4. Shows perfect lining formed, and penetration of the silver nitrate into the dentinal tubuli.

5. Freshly extracted tooth operated on outside the mouth. The crown and roots were filled with decomposing material which was not removed, the electrode and nitrate being applied to the surface; still the nitrate permeated the canals. Exposed surfaces of both canals shown.

6. Operated on outside of mouth. Foramen on inside of root.

7. Shows penetration in flat root with constricted and branching root-canal. Could not get broach more than one-eighth inch into canal.

8. Operated on, outside of mouth, for twelve minutes, attempting to force the silver nitrate through foramen of root.

9. Shows returning branch of canal that might easily be left unfilled.

Microscopical examination shows that the nitrate of silver is carried, by means of cataphoresis, to a greater depth into the tubuli of the dentine, more thoroughly sealing them, than when applied to the surface by ordinary mechanical means. In the preliminary experiments out of the mouth, the silver nitrate was used in connection with various agents, such as sulfate of soda, one per cent. solution of sulfuric acid, etc.; but the silver nitrate being itself a good conductor of electricity, it was found most satisfactory when used alone in an aqueous solution made with distilled water to avoid all organic material. Various strengths were employed, from ten per cent. to a saturated solution, those giving the best results being from forty per cent. to seventy-five per cent. solution.

The process of application is a simple one: Adjust the rubber-dam, and, if the crown of the tooth needs protection from discoloration, apply a thin coating of melted wax to the surface of the crown cavity; then apply the silver-nitrate solution to the canal by means of a wooden toothpick, or other suitably-shaped piece of wood, pump the solution into the canal, with a broach, as thoroughly as possible,

apply electrode to pulp-canal opening, place pellet of cotton saturated with the silver-nitrate solution around the electrode at the orifice of the canal, and the electricity does the rest.

The saturated cotton turns first a light green, which grows darker until almost black, and serves as an indicator. The time of application will vary according to the condition of the root-canal, its size, whether well opened, strength of current, and per cent. solution used. The higher per cent. solution the better conductor it makes, and the quicker it is deposited. From one to five minutes seems to be ample time.

After removing the electrode, cleanse the pulp-cavity and canal as thoroughly as possible with dilute ammonia, to neutralize the nitric acid formed, which also hastens the darkening of the nitrate. Then dry with hot air.

In the majority of practical cases, I have been using the nitrate of silver after the root-canal has been sterilized, although in several cases it was used without previous sterilization, the cavity sealed, and no further trouble experienced.

This root-canal lining is not advocated for all teeth. Indeed, the practitioner must use judgment in its application. It would not be advisable in the anterior teeth, on account of discoloration, or teeth where the foramen is large, as in teeth not fully developed, and others, on account of the liability of forcing it through the apex of the root. Just what would result from such an accident I am unable to say from practical experience. I have tried to force the solution through the apex of a normal root, out of the mouth, but in every instance it has penetrated just through the foramen and stopped, due possibly to the forming of an albuminate when coming in contact with the tissues at the end of the root, and thus limiting its own action.

The object of these experiments is to find a means of treating root-canals that are too small to admit a broach, those branching or tortuous, those in flat-rooted teeth, etc., where it is doubtful about inserting a protecting root-filling. If such root-canals are thoroughly lined with the nitrate solution, and it penetrates somewhat into the tubuli, as it does, the probability is that there will be no subsequent trouble, even though the root-filling should be defective ; and, indeed, it is a question whether root-filling would be necessary at all, especially in small canals.

Roots treated by this process out of the mouth, when filed down,

reveal the outlines of the canals, their constrictions, obstructions, and, in some cases, unlooked-for branches that probably would not be found in ordinary root-treatment and filling, and left, perhaps, as a harbor for bacteria in which to multiply and cause subsequent trouble.

This is only the beginning of a series of experiments in this direction. What the future may disclose time alone will tell.

DISCUSSION.

DR. ABBOTT: I have listened with a great deal of interest to these two papers. I have never used what is known as cataphoresis, although about ten years since I first described a process by which I thought work of this description could be done; but I never yet saw an apparatus that would seem to answer the purpose, or do away with the great amount of material and machinery that seems to be connected with this sort of work. Still I fancy there is a great deal to come out of the use of electricity in operations upon the teeth and mouth. I do not, however, see any special advantage in the use of nitrate of silver in the roots of teeth. It is certainly a material which must be used with extreme care to prevent its coming in contact with the crown of the tooth, especially under the cataphoretic influence. That is, under the influence of the electrode it would be forced into the tooth to such an extent as to discolor it so that it could not be restored to its natural color. I know that outside of the mouth this is a comparatively easy thing to do, but it is not so easy a thing to do in the mouth. I fail to see any special advantage in the use of material of this sort in the roots of teeth, when they can be handled so much more easily and quietly, and with just as much certainty, if not more, as with this process. I cannot understand why it is that men generally devise apparently the most difficult way of performing operations. Perhaps it is a mode of education, and as such I have no doubt it is of service, but at the same time I believe it is the duty of every man to learn to make operations in the mouth with the least possible trouble to the patient and to himself, and with the least possible expenditure of time. In my judgment cataphoresis means a waste of time, and possible injury to the patient.

The reader of the paper said he could hardly imagine or say what the result would be in case nitrate of silver was forced through the apex of the root of the tooth into the tissues beyond. Of course he knows very well that nitrate of silver is an escharotic, that it destroys

tissue to a certain extent. He says a strong solution—seventy-five per cent.—accomplishes the work better than a ten per cent. solution. A solution as strong as that, forced through the apex, will cause a great deal of irritation, and he will find himself in a deal of trouble, probably, in overcoming the disturbance. Still it may be overcome. It is a common thing to force an escharotic through the ends of the roots of teeth without doing any harm. In fact, whenever I force chlorid of zinc through the end of the root of a tooth, I know that I can reduce the irritation it produces with very little trouble. All that it is necessary to do is to produce counter-irritation on the gums sufficient to overcome the irritation at the end of the root of the tooth, and it will subside in a short time.

DR. BARBER: In regard to Dr. Abbott's idea of discoloring the tooth, if he will take the pains to cover the teeth with a thin coating of wax, as spoken of by Dr. Bethel, introducing the electrode into the mouth of the canal,—the current of electricity passing through the course of least resistance, which is directly down the canal,—I do not think he will have any trouble with the discoloration of the tooth. As to forcing the chlorid of silver through the apex of the root, I have been doing that for some time, as Dr. Bethel knows. I have made a number of practical demonstrations with it in the mouth, in cases that I was treating, where I was afraid to do anything else, and have not had the least trouble so far with any of them.

DR. AMBLER: It is not intended that this process of applying a solution of nitrate of silver to root-canals should be used in the teeth of young persons, where the foramen is large, or where the end of the root has not been entirely formed. A dentist who is accustomed to making operations upon root-canals can determine that fact for himself before he begins to operate.

The way it came about was this: I suggested that a solution of nitrate of silver be applied to all cavities in teeth which were to be filled with amalgam, for the reason that teeth break away a great many times around amalgam fillings, and also for the reason that a great many amalgam fillings either contract or expand. If a deposit of nitrate of silver was made in a cavity after it had been prepared for the filling, and the filling leaked, or the wall broke away to a slight extent, or there was a fracture in the wall, there could not be any decay under the amalgam filling, as long as the deposit of nitrate of silver lasted. It is not claimed by Dr. Bethel or myself that the application of nitrate of silver is anything new, but the claim is that

the application of a solution of nitrate of silver to large cavities, in pulpless or live teeth, before they are filled with amalgam, and also its application to root-canals, were first brought out last May by Dr. Bethel and myself. The sterilizing of root-canals with silver nitrate came about through my experimenting out of the mouth and in the mouth with solutions of nitrate of silver in cavities which were to be filled with amalgam. It is a very easy matter to apply it, if one has a cataphoretic instrument, because you can take a very small platinum wire for the positive electrode, and, after dampening the canal with the electrode dipped in the solution of nitrate of silver, then place the saturated cotton in the mouth of the canal, pass the electrode through it and turn on the current, as has been explained in the paper.

Of course, the application of nitrate of silver to a cavity before filling with amalgam can be done without cataphoresis; anybody can do it in the old way. But the advantage of cataphoresis is that it drives the medicament into the tooth-substance, and especially so in a devitalized tooth and in root-canals. In a root-canal operated upon in this way you have produced an insoluble compound. If there is any leakage or imbibition of fluid through the cementum from the outside,—and a great many claim that there is, and also that there is a circulation going on through the cementum all the time,—if there is any such thing, there cannot be any penetration of the insoluble compound from the outside. If the tooth is filled afterward and the canals are filled, there cannot be any leakage from that direction.

We think that this is the most perfect method that ever has been produced. I have never seen any untoward results from operating upon the teeth where I could not pass a broach through the foramen, and those are the ones upon which I apply this cataphoretic method.

If I do not wish to discolor a cavity in a tooth and do wish to apply this process to the canal, I fill up the cavity entirely with melted wax and then cut out the center of it. Then you have the walls covered, and you can make your operation on the root-canal without discoloring the tooth at all.

I can make a deposit on a tooth in or out of the mouth that will be so thick that by burnishing a little it will shine like metallic silver. You cannot get any such deposit as that on a tooth or in the root-canal by the old method of applying the silver nitrate.

DR. STEPHAN: I cannot say that I would indorse this method of

using nitrate of silver. It seems to me that if it becomes an insoluble compound, or, in other words, if this nitrate of silver is decomposed, and we get metallic silver, as we certainly must, the result is an inert compound, and consequently its efficiency ceases.

I think the suggestion of applying medicaments to the root-canal by the cataphoretic method is a good one, if we can get some antiseptic which will not be decomposed, whose efficacy will continue for a length of time. As to using nitrate of silver by the cataphoretic method, in cavities to be filled with amalgam where the pulp is still alive, I should certainly say that it was entirely out of the question, for the simple reason that the pulp undoubtedly will die. The nitrate of silver will kill it. Now, if a metal is placed over this deposit of nitrate of silver, pure silver will be deposited on the under side of that metal. Consequently the nitrate of silver would be inert.

DR. B. HOLLY SMITH: In my judgment it is a source of congratulation that our profession lays tribute upon all sciences and all arts, and I predict for the use of cataphoresis a great future. I am pleased with the suggestions that have been made in the paper, but, as has been said, this is just the beginning of experiments in this direction. I think we should in the discussion encourage these experiments. I am, however, at a loss to know why the current of electricity should select as a conductor the canal of a tortuous root partly filled with fetid matter, or possibly a vacuum, and the nitrate of silver be deposited in this particular line, and not go directly toward the other electrode; why it should not penetrate the cementum and into the soft tissues. I simply want to make that point and ask that question, as a matter of interest to the Association. I have experimented a little in the use of obtunders, and have found the objection of Dr. Abbott as to time to be entirely misplaced. As a matter of fact, if a man wishes to pursue a certain line of work, he always arranges his work to accommodate himself; and it is quite possible, by having two chairs and using the method of cataphoresis, to make the application and go on about something else, having the machine and your assistant do what you might otherwise be called upon to do. I have my apparatus attached to the extracting chair, and it has been my custom, when I proposed to anesthetize the surface of a tooth, either to allow the patient to hold the electrode, or to put it in the hands of an assistant; and no time is lost in this direction. So I do not think the point in reference to the loss of time well taken. I think that this operation has a permanent usefulness in our daily work, and I do not

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see why it should be condemned on account of the time taken. We can arrange for that.

DR. HEAD: Dr. Holly Smith has asked why the current would naturally take the course of a tortuous root-canal, instead of disseminating itself through the tooth-substance.

The tooth-substance is a very poor conductor, while the root-canal, full of moisture, is a good conductor, and the current invariably follows the route of least resistance.

DR. TRUMAN: The use of nitrate of silver for this purpose is entirely new to me, and it seems to require more consideration than has been given it. It is certainly true that this agent is a powerful antiseptic, and will prevent micro-organisms from developing; but at the same time we all are aware that it will discolor tooth-substance. That does not require any demonstration or experiment. It is as old as dentistry. Now, if that be carried into the tooth through electrical osmosis, where are the limitations? Can it be controlled and confined to the neck of the tooth or solely to the larger tubuli of the dentine? I think not, if we have any evidence from past experimentation. My investigations with nitrate of silver in tooth-substance settle the question in my own mind that it does not require electrical osmosis to carry it into the tubuli of the tooth. Indeed, I have carried it there by simply placing a saturated solution in the root-canal, and the entire dentine has become thoroughly discolored. This was clearly demonstrated through a series of experiments that I gave to the profession in January, 1895 (*International Dental Journal* and *Dental Cosmos*), in regard to the use of agents carried through by imbibition into the canals or into the tubes of the teeth. Now, when we recollect that between the larger tubes in the teeth we have minor tubes, and that these tubes run in every direction, toward the cementum and toward the crown, how is it possible to limit this action? These are important matters. When a question of this kind comes up before this body, it ought to be answered, because unguarded statements are dangerous. If this should pass from here without any qualification, many will be experimenting with nitrate of silver without due caution, and the teeth will become entirely discolored. I cannot see or understand how the action of this agent can be limited.

If we must have something to penetrate the tubes of the tooth thoroughly and coagulate their contents, why not use some other agent? Why not use chlorid of zinc? We all know what this will do, and

we are equally familiar with the fact that it will not discolor. Long ago, when oxychlorid of zinc was introduced into the profession, it was discovered that teeth treated with it preserved their color. Why, then, take an agent that we know will discolor, and place it in the tooth, and in that most dangerous of all positions, in the canal? It seems to me that we are on the wrong line of experimentation, when it has been demonstrated that chlorid of zinc will do the work. I would not dare to carry it in by cataphoresis, because, as has been said by Dr. Abbott, chlorid of zinc is an escharotic, and an escharotic must be handled carefully; but you can carry it into the canal of a tooth by imbibition, and it will penetrate into every tube of the tooth. Microscopical examinations have demonstrated this. How do these agents act? What does nitrate of silver do? Nitrate of silver is one of the best coagulants we have. But chlorid of zinc is a better coagulant by far, and you can get the effect, not alone from chlorid of zinc in solution, but from oxychlorid of zinc. Place that in the canal in almost fluid condition, and you have a better coagulant and you have a more perfect antiseptic than you can get from any other agent that I am familiar with.

DR. RHEIN: The remarks of the last speaker in regard to the disadvantages and the dangers of using a remedy which is so apt to discolor the dentine should undoubtedly meet with our serious attention, and I most heartily indorse the statements in regard to the superior advantages of chlorid of zinc, if it is necessary to use a coagulating escharotic in the root-canals. My object in saying a word on this subject, besides indorsing this matter, was, on the other hand, to show the superior advantages that we can obtain in the use of the chlorid of zinc through cataphoretic aid. The speakers who have had no experience in therapeutic medication by means of cataphoresis are very apt to exaggerate the dangerous possibilities resulting from using remedies in this manner. If a remedy is a good thing in a given case, that remedy cannot be used in too nascent a condition. And that is the effect that we obtain therapeutically when we use cataphoresis in order to drive the remedy that we are using through the substance that we desire to medicate. For this purpose we have no better agent than the ordinary pure metallic zinc. When this is introduced cataphoretically, we produce nascent oxychlorid of zinc. I wish to urge this point, while advocating the superior advantages of the chlorid of zinc, to show how much better it can accomplish its purpose if used by means of cataphoresis.

DR. TAFT: It seems to me that an exaggerated view is taken of the matter of the coloration of dentine by nitrate of silver. Why is it that coloration is produced? Nitrate of silver in solution is transparent—is a colorless fluid. When applied to the surfaces of dentine or enamel, or to dentine in a cavity, at first no coloration is observed. In a little while, however, the discoloration is seen. What takes place? The nitrate is decomposed. The nitric acid is set free from the oxid of silver, and the oxid is deposited on the surface, not in the dentine. The nitric acid has forsaken the oxid of silver and combined with the lime-salts of the teeth. That far it acts. The oxid is deposited upon the surface, and not in the canaliculi. So far as I now remember, I have never seen a tooth stained in the canals by nitrate of silver. It is used often on the surface of dentine, at the necks of teeth where the dentine is sensitive, and is an excellent application for that purpose. Always, unless it is at once removed, there is coloration of the enamel or dentine. That remains until it is worn off, unless it is taken off. It is easily removed, being simply a deposit upon the surface. It is true that the nitric acid set free from the oxid combines with the lime-salts. That far decomposition of the tooth-substance takes place. That is very superficial, however. The nitric acid does not penetrate deeply into the tooth, because it very soon becomes saturated with the lime, and then it is just as inert as a piece of chalk. It does not require hours for that to be accomplished, but within a few minutes this process is completed, and then no further action takes place. It is true, so far as this decomposition occurs, the surface is roughened, and into that roughened surface, as upon a piece of ordinary carbonate of chalk, the nitrate of silver may slightly penetrate. But placed upon the enamel, or upon smooth, solid dentine, there is no appreciable penetration of this coloring material, as you will find by taking a piece of chamois or a buff wheel, with fine polishing powder. It may be cleared away in a moment without cutting away any appreciable amount of the tooth, showing clearly that there is no penetration. I have never seen a tooth deeply stained by the nitrate of silver.

Now, I can hardly see the occasion for using the cataphoretic process for the decomposition of the nitrate of silver. In all cases when it is applied to the surface of a tooth, or in the canal or pulp-chamber or cavity of decay, the decomposition takes place promptly, because of the affinity between the nitric acid and the lime in the tooth—the greater affinity between those elements than between the

acid and the oxid of silver; the nitric acid forsaking the oxid and uniting with the lime-salts, and there stopping its operation promptly. I do not conceive that the decomposition would be affected any more promptly than it will be by the simple application of the fluid upon the tooth itself. It may possibly hasten it a little, but it will be nothing better. One speaker mentioned the nascent condition of the freshly-liberated nitric acid. This always exists upon the decomposition of any such material.

Now, it is said, and is demonstrated many times by observation, that teeth with amalgam fillings become deeply stained. How is that? Does the nitrate of silver stain in the same way? No, by no means. What is the method of staining by amalgam? It is simply by the vapor of mercury from the mass of the amalgam passing into the canaliculi to a greater or less extent, there becoming oxidized, and discoloring the dentine so far as penetration takes place. It does not unite with the dentine, or with any constituent of it. This is not possible with the coloring material of nitrate of silver. The nitric acid action upon the contents of the canal is much of the character of that effected by the introduction of sulfuric acid, which has been discussed within the last two or three years considerably, for the cleansing and freeing of canals of *débris* and rendering them antiseptic. I do not believe that it is better than nitrate of silver solution. It may be just as good, but no better, as I regard it. But the objection that it stains the teeth is one about which we need not be anxious.

DR. TRUMAN: Will Professor Taft allow me to ask him a question?

DR. TAFT: Certainly.

DR. TRUMAN: I wish to ask Professor Taft whether he has ever made any microscopical sections of a tooth after it has been saturated with the nitrate of silver solution, and, if so, what was the result.

DR. TAFT: I have a number of slides taken out of teeth to which nitrate of silver had been applied, and they demonstrate that there is no penetration of the coloring material into the tubuli of the dentine. I have not a single slide that shows any penetration. I have a number of slides which show clearly that it does not take place.

DR. FILLEBROWN: I saw some specimens where the dentine of the tooth was colored almost out to the cementum. I wish to ask the gentleman who presented them whether the specimens were cut after the injection or before.

THE PRESIDENT: The gentleman who read the paper will remember that, and in his rejoinder answer the question.

DR. STELLWAGEN: Of course, everything which advances our profession is of advantage, but it is a question whether we are not approaching such a condition of affairs as will complicate matters very seriously by the use of so much apparatus, and restrict the usefulness of the young dentists, and those without considerable means. This would, under the present compound and costly batteries, so called, be a perfectly legitimate objection to cataphoresis. Is cataphoresis necessary? It is in order to ask the members of this Association in what per cent. of cases, or perhaps in how many cases out of a thousand, is cataphoresis really essential. For the past year I have been using an appliance that is so exceedingly simple that it probably will scarcely hold your attention for five minutes to talk about it, and yet its use is attended with almost uniform success, and so little trouble that I feel very much inclined to pay great respect to the little toothpick. Sharpen the ordinary Lisbon or Portuguese toothpicks, made of orange or holly wood, say several dozen of them, making them to correspond to the average sizes of the different pulp-canals that you have been accustomed to treat. Keep them in a little glass-stoppered jar with the medicament that you desire to make use of; perhaps two or three dozen in a strong solution of carbolic acid, with a little alcohol to keep it fluid; some in pure crystallized carbolic acid, melting the carbolic acid and letting the toothpick sink into it, and withdrawing the toothpick from the melted carbolic acid when you wish to use the strong acid. Here I would say that there is a wide difference between the different kinds of carbolic acid. Merck's has, in my hands, answered all the legitimate purposes for the teeth of the diluted mineral acids, and the nitrate of silver. It has given me perfect satisfaction, with scarcely a single exception.

The method of proceeding probably does not differ from that of a great many others, but the toothpick, when kept in the solution, becomes very flexible, and with a little care can be worked up gently into almost any sort of a canal. Of course, where, as in a bicuspid, two tubular canals are united by a flattened one we may not actually get the wooden point into that part, but we can get it up as far as there seems to be a practical necessity, and the capillary attraction of the dentinal tubules will complete the rest. After washing out as thoroughly as is possible to accomplish with water from a syringe, I then wash out with wet toothpicks, moistened, for instance, in distilled water, and follow this by drying out the canals with dry toothpicks.

It may take a dozen. Take the toothpick by the flat end, and with a pumping motion move the point up and down the pulp-canal, repeating the procedure with fresh and clean wood until no discoloration or other substance is to be found. Then wash with alcohol, and, if it be desirable to make the canal very dry, do the same thing with chloroform. After thoroughly drying, insert a toothpick saturated with whatever medicament you may select or prefer to use. One of the most satisfactory to me is the common solution of camphor and carbolic acid. You can make it by mixing the camphor and carbolic acid in about equal parts. If there is a slight excess of camphor, it is rather an advantage, because the camphor gradually evaporates from the compound. Oftentimes it is well to cut off the toothpick in the pulp-chamber, and leave it there, projecting enough so that it can be pulled out at any time. After treating a tooth in this way, it may often be filled immediately; and if you design to fill the tooth with amalgam or with gutta-percha, or some temporary filling, it very often is best to leave this point of the toothpick in the canal.

For a filling-material a good word should be said for wax, even for permanent filling. So delightful and pleasing has been my success with it; it is so unirritating; it will penetrate into almost all the little delicate and tortuous canals, particularly in the lower teeth, where we are liable to have so much trouble. The application is simple,—an ordinary dental probe, heated, will enable you to warm the wax until it is fluid, and it may readily be coaxed down into the very minute portions of the canal. Leave the root-canal filled in that way, with the toothpick pushed down into the wax, for a temporary filling. Now, for a permanent filling, I prefer to make a number of toothpick-shaped rolls of non-cohesive gold foil. Warm these, and push them into the canal, forcing the wax in front of them.

Finally, you may fill the heavier and thicker part of the pulp-chamber solidly with gold, if preferred, putting in enough of these little gold points, and wedging them in, and pushing the wax in front of them. The surplus wax, if any, will come out around the gold. Cut that off and you have the pulp-cavity permanently filled with gold, and the inside of the canal coated or lined with wax. I have yet to find a case where the wax produced any irritation. For a year past (of course that is not a very long test) I have filled many thus, and have yet to find a case where the wax gave any trouble. The wax certainly will last as long as the patient lives, and probably almost as long as the tooth. What reason is there that it should not

last longer? We know that it is common to find wax in mummies, and that it has changed comparatively little, if any. I see no valid objection to the use of wax, and with the hot gold pressing it into the finer parts of the canal we can succeed in making a perfectly water-tight, air-tight, and gas-tight filling, with less danger of irritating or injuring the surrounding tissues than with the other materials ordinarily recommended, and less chance of change in bulk or of adaptation to the needs of the cases. It is bland, soothing, impervious to the irritants that might attack the parts protected by it, and, in a word, is an ideal pulp-canal filling and dressing. Even if pressed through the apical foramen it would be less dangerous to the tissues than any of the substances used for canal-filling.

DR. HARLAN: Unfortunately I did not hear the first paper, and hence will not discuss it. I believe the second paper, relating to the treatment of minute root-canals with nitrate of silver, directed cataphoretically, is the subject under discussion.

THE PRESIDENT: That is correct.

DR. HARLAN: From a somewhat extended experience in experimenting with teeth planted in plaster of Paris, paraffin, and wax, and from some practical experience with teeth implanted in the jaw, I should simply like to say that solutions of nitrate of silver do not penetrate the dentine of such teeth to any appreciable extent, or to such an extent that it would cause a discoloration that would become disfiguring. Dr. Taft made a correct statement about the decomposition of nitrate of silver. It is only by continued persistent force of the electric current that the decomposed nitrate of silver or oxid of silver can be driven to any extent into the dentine. (Oxid of silver is not a coagulator of albumen.) The specimens which have been handed around here show that the oxid has not reached the cementum, and it does not reach the cementum because it becomes deposited so thickly after a while that it prevents its further penetration. I have now in my possession a number of teeth that have been treated with nitrate of silver solutions and planted in plaster of Paris, that were planted from the eighth to the twenty-fifth of September, 1894, and I have not yet opened them, but I shall open them presently and will be able to make a report on them. I have any number of teeth planted in plaster of Paris, paraffin, and wax, with various kinds of oils and coagulating agents. A good many of them I have reported on at various times. Dr. Truman says that chlorid of zinc will coagulate the contents of the tubes, and so forth.

Well, if it does, why does it not injure the cementum, which is living?

DR. ABBOTT: It cannot go far enough.

DR. HARLAN: No; it cannot go far enough, never did, and never will. Chlorid of zinc is one of those self-limiting coagulators of albumen, and there have been no experiments so far that have proven that chlorid of zinc ever penetrated through the dentine of a tooth. I saw Dr. Truman's experiments, and they did not prove it at all.

DR. SMITH: By cataphoresis?

DR. HARLAN: By cataphoresis we may force a thing; but Dr. Truman injected this thing into the discussion, and I want to correct that impression, which is wrong. Chlorid of zinc, as soon as it has satisfied its affinity for water, stops every time. The fear that was expressed by Professor Abbott that the nitrate of silver would be driven through the ends of the roots is simply imaginary, because, just as soon as it is driven through the end of a root and comes in contact with the soft substance, it forms a coagulum; it will not go any farther. It is superficial. Right here on the end of my finger I have now the full strength nitrate of silver, which got there accidentally Saturday of last week; it does not penetrate.

DR. ABBOTT: What do you call full strength,—saturated?

DR. HARLAN: Full strength; $AgNO_3$, argenti nitras. This is no kindergarten association. This is where you get down to the bottom facts, and I am very glad that Dr. Bethel and others from Ohio have been experimenting in this direction. The question that will be brought up by the Section of Materia Medica and Therapeutics to-morrow morning will bear more or less upon this subject, when I should like to have something further to say. But just now I want to disabuse the minds of those present who have the idea or the thought that nitrate of silver will permanently discolor the dentine of a tooth. It does not do it.

DR. TRUMAN: This has come down to a question of veracity. [Laughter.] Dr. Harlan absolutely says that it is impossible to carry nitrate of silver into the dentine. I say just as dogmatically that it is possible to carry nitrate of silver into the dentine, almost up to the cementum. Now, whom will you believe? It is a question simply of methods. If I had known this subject was coming up at this meeting I should certainly have brought slides here, showing dentine discolored with nitrate of silver. It does not show very well in these

specimens which are being sent around, but there is marked evidence of discoloration even in these. Dr. Harlan says further that chlorid of zinc will not coagulate through the tubuli of the teeth. That is another assertion. I know that it will. Now, you may believe me or not. I have made section after section, after the treatment by chlorid of zinc, and have traced its action nearly to the peripheral terminations of the tubuli. I did not show these to Dr. Harlan. What he did see was the coagulation through capillary tubes, which I demonstrated before the Academy of Stomatology of Philadelphia in his presence. Those who saw those tubes know very well that the agents used, including nitrate of silver, penetrated the minutest tubes, notwithstanding his assertion that coagulation could not take place beyond the mouth of any tube. Now, in spite of these facts he asserts it has never been done. I have not a chance to prove it here to-night. For the present you must accept my statement, and for its truth I simply refer you to the record.

DR. RHEIN : I wish to make a slight correction in the remarks I made in reference to the use of zinc in a metallic state. Using the word cataphoresis as commonly as we do, I used it there to illustrate the decomposition of the metallic zinc into the oxychlorid of zinc. It was only after I took my seat that I saw that I should have used the word to express what is actually accomplished by electrical means in that manner, and that is more electrolytic action. It is electrolysis that takes place when the free zinc is dissolved and the oxychlorid of zinc is developed in a nascent state.

DR. AMBLER : Nitrate of silver has been used for the prevention of the further progress of superficial decay, and has been applied also at the necks of the teeth to prevent further erosion. By the use of cataphoresis you can positively stop any case of erosion at the neck of the tooth. You should turn on voltage enough so that the patient feels it, say eight or ten volts ; some patients will bear more and some less. Leave the application there until the tooth turns a light shade of green ; then your operation is completed. I have had some very severe cases of erosion within a few months. Just as long as the black deposit remains you will have no decay. That is a positive statement.

DR. PEIRCE : You mean no erosion.

DR. AMBLER : Yes ; I mean no further erosion. In regard to the soluble electrodes of which Dr. Rhein has spoken, there was one point which he did bring out, and which I wish to emphasize. That

is, that these electrodes should be made from chemically pure zinc and chemically pure copper. The copper electrode is simply a piece of copper wire. The chemically pure zinc electrode may be made round or oval. If you wish to treat a pyorrhea pocket or an abscess, shape your wire to suit the pocket or the fistula. There are several who are working in the direction of treating pyorrhea with these pure zinc and copper electrodes by passing them into the pocket after the tooth has been thoroughly cleansed from any calculus that may be present.

Several experiments have been made, and there are those who are trying to find some medicament that will take the place of nitrate of silver which will not produce any discoloration. We shall all be ready to use it, in these cases of erosion especially. But so far nothing has been found that will take the place of nitrate of silver, because nothing else will form an insoluble compound which will unite with the constituents of the teeth, whether applied in cases of erosion, or in cavities, or in the root-canals.

If a putrescent pulp-canal or pulp-cavity comes into the office to be treated with nitrate of silver, we do not put in the electrode the first thing. We cleanse out the pulp-canal, and then it is ready to operate upon with the nitrate of silver solution and with the small platinum electrode; the nitrate of silver will discolor as far as the canal is damp.

Solutions of cocain have sometimes failed when applied to obtund pulps so that they could be extirpated. In such cases, if you will use a strong solution of nitrate of silver, in a few minutes you can destroy the life of such a pulp so that you can extirpate it. In a few cases where I have obtained teeth that had living pulps in them, as soon as they have been extracted I have immediately split them open, and, upon applying the nitrate of silver solution and turning on the current, the pulp in a very few seconds' time has completely coagulated and turned almost white, being left in one solid mass. That shows the action upon a pulp just as near alive as you can get it outside of the mouth.

Let it be clearly understood that root-canals are only *lined* with silver nitrate, and afterward *filled* with any material the operator chooses.

DR. TAFT: Just a word, in order to make this perhaps a little clearer. Dr. Ambler says that the oxid of silver is an insoluble compound. He ought to have said insoluble in the fluids of the

mouth. That is the reason why you have it remaining upon the teeth for a considerable time, weeks or months, perhaps, sometimes. It is not soluble in the fluids of the mouth or in any fluid that is likely to be in the mouth, and hence it remains as a coloring-material upon the surface of the teeth; the oxid of silver not being soluble in any fluid in the mouth, it cannot pass in the solid form into the dentine.

Now you have the action of the nitric acid beneath that, but this remains as a protection. Dr. Ambler speaks of this deposit arresting abrasion, the wasting away, that peculiar process about which we know but little. It does arrest that process while it remains upon the teeth. But if it is cleared away by abrasion or by the friction in the use of the teeth, the abrasion will recur.

DR. AMBLER: That is what I said; as long as the discoloration remains, the process is arrested.

DR. TAFT: Then the question is, how does it stop it? It simply is a shield, or protection, or covering of the affected surface from the agent that produces the wasting. That is all there is of it, and it indicates very clearly, it seems to me, that the influence that wastes the tooth away is external, not within the tooth, which has been asserted by some.

DR. PATTERSON: While there is no one who believes more in the use of nitrate of silver than I do, and while I use it in a great many kinds of cases presented, still it will not do to depend upon this soluble matter which we leave after the introduction of the nitrate of silver by cataphoresis or in any other way, or to depend on what it leads up to, as mentioned by two or three speakers, the filling of root-canals with wax, paraffin, and all sorts of stuff like that. You must not depend upon that, because eventually all these are penetrable to bacteria. There is no question about that, I think, and that is the practical part of the question. We cannot and must not depend upon these, but must depend upon an indissoluble and perfectly antiseptic root-filling material instead. I began by saying that I believed thoroughly in the use of nitrate of silver; I use it very much in my office, especially in pyorrhea pockets and incipient decay, but as to depending upon it to render inert and antiseptic the material that has been spoken about, by cataphoresis or other methods,—to depend upon that instead of an impermeable root-filling is a mistake, it is whipping the devil around the stump, it is another Söderberg method, and we do not want anything to do with it. It is an excuse for laziness.

There was another statement made in this discussion which ought not, I think, to be passed without remark, and that is the statement that the discoloration of the tooth from an amalgam filling is on account of the vaporization of mercury. The discoloration is caused by pigmentation from oxids or sulfurets, and I think I can prove, at the proper time, that it is not from any vapor of mercury.

SECTION V.—Continued.

The Disinfection of Pulpless Teeth.

By JOSEPH W. WASSALL, of the Section.

ARE current methods of practice in the treatment of teeth with necrotic pulps strictly in accordance with modern views of asepsis? Judged by what is said and written for societies, periodical literature, and text-books, which may be presumed to fairly represent the methods in common use, this question must be answered negatively.

It would seem then that no apology is required in bringing before you so trite a subject; on the contrary, if the inference which my question raises is correct, it is eminently appropriate that this representative body should give the matter its serious consideration.

Given a tooth with a decomposing pulp, what is the nature of the pathological state with which we have to deal? We find a condition in which the pulp-chamber, root-canals, and dentinal tubules are loaded with putrefactive animal matter. One has but to recall the large amount of soft tissue contained in dentine and its formative organ to realize the danger of the situation. The recent analyses of dentine made by Dr. G. V. Black, and reported by him in the *Dental Cosmos* for May, 1895, give an average of 25.36 per cent. of organic matter, and 10.06 per cent. of water. The pulp would constitute additional soft tissue, amounting to about one-third of the bulk of the dentine. Now, while the removal of this necrotic mass from the chamber and canal, and the disinfection and filling of the vacated space, is a manifest necessity, and is the general teaching and practice, I contend that there is not a general appreciation of the fact that the dentine itself continues to remain septic.

It is for the purpose of emphasizing the necessity for scientifically sterilizing this putrid zone of dentine that this paper is offered.

What is the chemical and physical nature of this putrescent soft tissue? Putrefaction is a fermentative decomposition in dead animal tissue, produced by a class of micro-organisms termed saprogenic bacteria. Professor W. D. Miller, in his "Micro-Organisms of the Human Mouth," 1890, says, "The fermentation of nitrogenous and more particularly of albuminous substances which is accompanied by the development of large quantities of gaseous and stinking products is called putrefactive fermentation or simply putrefaction." The definitions given in the latest editions of Foster, Gould, and Dunglison are almost identical with the above.

McFarland ("Pathogenic Bacteria," 1896) describes the chemical changes taking place in the process of putrefaction as follows: "The first step seems to be the transformation of the albumins into peptones, then the splitting up of the peptones into a large number of gases, acids, bases, and salts. In the process, the innocuous albumins are frequently changed to tox-albumins, and sometimes to distinct animal alkaloids known as ptomaines." To quote Miller again (*ibid.*): "This name (ptomaines) has been given to certain waste products of bacteria closely resembling vegetable alkaloids which are formed in putrefying mixtures."

Ptomaines have exceedingly poisonous properties. According to Brieger (an authority on this subject), they have an action on the animal body similar to snake poison and curare. Extended researches into the nature of these substances made by Bergman, Panum, Brieger, Suelzer and Sonnenschein, Vaughan, and others prove that their toxic properties abundantly suffice to produce the violent inflammatory phenomena which are observed to follow the contact of putrescent pulp matter with the living tissue. Is it not apparent, then, that the mere removal of the canal contents and a single application of any known antiseptic is insufficient to sterilize or render permanently innocuous these deleterious alkaloids? Yet every day such doctrine is enunciated, and such methods are advocated and have authority because they pass unchallenged.

There are three classes of cases in which we have pollution of the dentine by putrefactive products:

1. Teeth the pulps of which have perished from encroachment of caries, the pulp-chamber being open.

2. Teeth the pulps of which have died from proximity of a large

filling, attempts at capping, or insufficient sterilization of the layer of caries allowed to remain over a pulp.

3. Pulpless teeth the canals of which have been imperfectly filled or sterilized, or both.

A tooth the pulp of which has been devitalized intentionally is excluded from consideration in this connection for the reason that, under ordinary aseptic precautions, putrefaction does not occur.

The essential pathological condition to be recognized is the same in all three classes given. We have dead dentine infiltrated with matter highly irritating and poisonous to living tissue in intimate contact with vital cementum, which, in turn, is closely enveloped in pericementum.

What must the effect be on the cementum and peridental membrane of the *materies morbi* which are present in the underlying dentine?

There is no escape from the conclusion that it must account for many morbid conditions and symptoms, the etiology of which is otherwise obscure. There are, no doubt, exceptions—many of you may call them to mind—of teeth in this state which cause no discomfort. But a little more time may prove that even these cases will not continue quiescent. Unquestionably, this condition is responsible for numerous affections, more or less difficult of diagnosis, varying from reflex neuroses to remotely situated abscesses, the only subjective symptoms discoverable in the causative tooth being a slight sense of lameness upon mastication or palpation.

What treatment does this pathological state indicate? It will not be uninteresting to first notice some of the methods which have of late been prominently set forth.

The Transactions of the World's Columbian Dental Congress contain an article by Professor Miller, entitled, "Concerning Various Methods Advocated for Obviating the Necessity of Extracting Devitalized Tooth-Pulps," in which, while recognizing the greater value of complete root-canal filling, he advises for general practice the removal of the bulbous portion only of the pulp, and the covering over of the remaining portion with a tablet composed of slowly dissolving antiseptics, such as sublimate and thymol combined. The distinguished author confesses that teeth so treated inevitably give trouble, if the victim lives long enough, which is condemnation sufficient.

This, together with other variations upon the process of mummi-

fication, as advocated by Witzel, Herbst, and Söderberg, are only temporarily effective, because, to use Dr. Harlan's words, "they will not stay mummified."

Is it not a fact that the only pulp which may be successfully mummified is the living pulp? or, to be more accurate, the mummifying agent must be applied before pulp death. This would explain the observed efficacy of the oxychlorid of zinc pulp-capping operation.

Emil Schreier, at the same congress, presented a method of destroying pulp-remains with a mixture of sodium and potassium, which is objectionable on the ground that the action of the drug does not extend into the entire length of the tubules. Dr. J. Foster Flagg, a name which has far-reaching influence, in a paper read before the New Jersey State Dental Society (also published in the *Dental Cosmos* for March, 1895), places the stamp of his approval upon this unscientific procedure. He says, "I desire to combat to the utmost the claims of thorough removal of pulp-tissue as a matter of *first* importance." He also makes use of fifty per cent. solution of sulfuric acid for opening up the putrescent canals, which is contra-indicated because it is a coagulator of albumin.

Dr. M. L. Rhein, in a paper read before the Second District Dental Society of New York and published in the *Dental Cosmos* for March, 1896, presents his method of treatment of acute and chronic alveolar abscess. The treatment he therein outlines is insufficient for the disinfection of putrid dentine. It is inadequate to the requirements of the condition, because the disinfectant applications are not continued over a long enough period of time. He also falls into the error of using coagulating agents for the first surgical dressing, when it is quite probable that at the time the tubular structure of the dentine contains albuminous matter.

Professor Frank Abbott has written a work on Dental Pathology and Practice, which, owing to the author's eminent position both as an educator and a practitioner, will be widely read. It is peculiarly unfortunate for the young members of the profession, whose methods are most likely to be influenced by it, that that chapter devoted to the consideration of this question should be so inconsistent with modern bacteriological knowledge. It is somewhat startling to find that "until within a comparatively few years there was no apparently rational or successful treatment for pulpless teeth except extraction."

Shades of Parmly, Townsend, Harris, Maynard, and Atkinson! The filling of root-canals has been orthodox dental practice for more

than half a century. There are many gentlemen present at this meeting who have filled canals for thirty-five or forty years. Dr. McKellops told me yesterday that he recently saw a tooth still in the patient's mouth in which he filled the root-canal with gold foil over forty years ago. Dr. Corydon Palmer has filled root-canals since 1839. Dr. Abbott imparts a lucid understanding of the *fact* of putrid dentine and the conditions to be overcome, but the treatment proposed is contrary to the commonest laws of asepsis. The triumph of modern surgery is secured by striving to prevent the entrance of germs into, rather than their destruction after admission to a wound. How hazardous to teach that a pulpless tooth may be operated upon without first adjusting the rubber-dam. The neglect of this precaution against the ingress of the myriads of micro-organisms which are always present in the human mouth is hardly excusable at this day.

Dr. Abbott also recommends the use of bichlorid solutions for syringing out the pulp débris. This is of doubtful utility, because, like nitrate of silver, it is at once precipitated in the presence of albumins, thus losing its germicidal and antiseptic powers. (McFarland.)

It is also bad practice to pump zinc chlorid through a tooth to cauterize a pus sac until a course of treatment for sterilization of the dentine with diffusive disinfectants has first been completed.

These few criticisms are submitted in order to substantiate the charge made at the opening of this paper, that much of the modern practice in the management of pulpless teeth does not conform to the present status of bacteriological science.

The successful treatment of teeth contaminated with putrid pulp matter would, to my mind, seem to depend upon the strict observance of two details of procedure.

First. The exclusive use of diffusible disinfectants.

Second. The repeated and continued application of the disinfectant for a sufficient length of time.

The reason why I give diffusible disinfectants the preference over coagulating drugs is because I am satisfied that the exhibition of the latter at the pulpal orifices of dentinal tubules forms a plug of coagulated matter which prevents the further ingress of the disinfecting agent, imprisoning within the tubules putrefactive matter which will be a permanent source of irritation to the cementum and pericementum.

Again, if the position so ably maintained by Truman and Kirk is true, but which is not substantiated, that the entire contents of the

tubuli are coagulated, there is nothing gained, for the resulting mass, it is well known, is suitable pabulum for micro-organisms. Hence there would be no assurance that putrefaction would not recur within the tubules.

As bearing upon the controversy regarding the relative merits of coagulating and diffusive disinfectants, I desire to draw attention to some recent experiments reported to the Iowa State Dental Society in May, 1895, by Dr. Harlan. The starch and iodin test was employed. Freshly-extracted teeth had their pulps removed and their foramina sealed. Root-canal dressings of coagulating disinfectants were then applied in the usual manner; iodin was then introduced, and the teeth immersed in starch solution up to their anatomical necks. The characteristic blue color did not appear in the starch solution, showing that the root had not been penetrated by the iodin. The iodin itself is a coagulator of albumin, so the experiment was also made by using the iodin alone in the same manner, omitting the carbolic acid. No indigo color appeared, demonstrating that its coagulating effect on the contents of the tubuli was an effectual bar to its diffusibility.

It is difficult to reconcile the diametrically opposite results which seem to be obtained by Dr. Harlan on one side, and Drs. Truman and Kirk on the other. Perhaps the very complexity of the processes in experimentation and the peculiar delicacy of the handling required would account for some of the discrepancy. In the experiments, for instance, of Dr. Kirk, when the teeth were suspended in egg albumen, is it not possible that the apparent coagulum which is reported might not have been a growth of micro-organisms? The medium used and some of the conditions present were certainly favorable to a culture. Then, again, a very important point seems to have been entirely overlooked. If the putrefaction of albumin has advanced far enough, we no longer have albumin, but ptomaines, which are not coagulable. Thus it would be an easy matter to demonstrate either side of the question, tenable according to the degree of decomposition of the animal matter within the dentine. This latter point seems to force us to the conclusion that inasmuch as it is impossible, with our present knowledge, to accurately determine the stage of putrefaction with which we have to deal in a given case, the only safe course is to assume that coagulable material is present. Albuminoids, peptones, and ptomaines are soluble in the diffusible penetrating drugs used in this condition, but are not soluble in coag-

ulating agents unless such agents are diluted to a degree where they are no longer efficacious as disinfectants. In the investigations thus far published, the preponderance of evidence seems to be in favor of the avoidance of the coagulating drugs in the roots of pulpless teeth.

The second requisite to success in the disinfection of putrid dentine mentioned was the element of time. How long shall the dressings be kept in the canal before it is proper to fill it? Until the dentine is permeated throughout its entire depth, and until all micro-organisms and their spores may reasonably be expected to be destroyed.

My own observation is that these results are obtained in not less than twelve days,—oftener sixteen or twenty,—and in some few cases a longer course of treatment is required. The dressings should be changed every four days until no stain or odor is perceived on the cotton dressing other than the drug employed. Even though the dressing may come away clean on the fourth or eighth day, and you are morally certain that the bacteria are killed, it is imperative that the use of the drugs be continued for the full period, in order to also kill any spores which may be present, for they offer much greater resistance to germicides, and hence require more time for their destruction.

DISCUSSION.

DR. ABBOTT: I have been particularly interested in this paper, for more reasons than one. In the first place, because I am naturally inclined to defend my own position, as taken in my book that has been published within the last year. I am inclined also, as a teacher, to want and adopt the very best methods that I possibly can get hold of in the treatment of diseased teeth.

Now, let us see what scientific treatment really consists of. As I understand it, the crowning point of all scientific treatment is the result. If the result is favorable, then we want nothing better in the way of science than that, so far as treatment is concerned. You may say that there may be germs and spores left here and there, but supposing they are put in such a condition that they are unable to accomplish any harm? I think there is hardly anything ever put into the roots of teeth, or into the canaliculi of the dentine, that will always remain aseptic, or keep the parts absolutely in that condition. Still we have teeth that have been going on for twenty-five and thirty years, and with the modern treatment we have had teeth going on for ten and twelve years without the slightest disturbance whatever. Now, do we want anything better than that? We have had several

stages of this scientific treatment brought before us. They had it piled up on us in directions that have been sometimes almost alarming. We had a man, not many years ago, who would get up before this body and state that the only scientific way of treating pulpless teeth was to put a drill through the end of the root if you could get there; if not, go through the side of the root, or anywhere, so that the patient felt it. Usually it was going through the side of the root of the tooth. This was said to be the height of scientific treatment for teeth, and there was no other way to cleanse the canals of teeth, as taught by this gentleman.

Another method, not recent, however, but following that which has been for a good many years the only method *generally* taught, is the method adopted by the gentleman who read the paper, viz, that teeth should be treated day after day, day after day, for weeks, perhaps for months. With what result? A tooth has been cleansed with antiseptics, plugged with a temporary stopping of gutta-percha or perhaps cotton. It is supposed to have been cleansed of all putrefactive material. This is supposed to have been done at the first visit of the patient. The temporary stopping is left there for a day or two; perhaps three or four, as recommended in the paper. It is then taken out and septic material allowed to pass into the canal. It thus becomes filled up with germs of bacteria again. After two or three days it is opened and probably found filled with pus and blood. The "treatment" is repeated several times, until it is supposed that an aseptic condition has been produced. But instead, the disturbance produced by the germs of organisms at the apex of the root, each time the tooth has been opened, has not wholly subsided, and further trouble usually follows or is liable to.

I wish to call attention next to the treatment which has been condemned in the paper, but which I have advocated and which I have practiced for at least ten years; and I have yet to see, I am almost ready to say, one single failure in that treatment. They are so few that they are hardly worth mentioning. The treatment in short is as follows: the moment the tooth is opened the canal and contents are put under the influence of a very powerful antiseptic, and kept that way from that time on. It is not allowed again to become septic. Before the patient leaves my chair, the root and tooth are filled. I do not dry out the canal, but carry the oxychlorid cement into the antiseptic, with which it mixes, and the mass crystallizes, thus forming a permanent filling. After thus filling the canal, the crown is filled with

gold or other material as I choose. Gentlemen of long experience in this assembly will agree with me when I say it is almost an impossibility to dry out canals of many teeth in the mouth. Many have gone so far as to attempt to dry them with hot air, with I believe not the best results. Not only has hot air been used to dry pulp-canals, but with the expectation and avowed purpose of drying the substance of the dentine itself, the claim being that by so doing the canals and canaliculi were thoroughly sterilized. Is this ever accomplished? Is there anything in it that commends itself to a man of experience in the treatment of pulpless teeth? I think not, and I believe my opinion would be sustained by a large majority of this Association. If the canaliculi were made entirely dry, the tooth would be very likely to crack. There would be such a contraction of the dentine that the enamel would probably break, so that the tooth would be almost wholly ruined.

My method of treatment, as I said before, is one that any one can use; I have published it in so careful a manner that no one need make a mistake. I have said nothing that is not fact, nothing that practice has not fulfilled to the letter. "Scientific treatment" consists of successful treatment, as I understand the subject.

In reference to the coagulating materials, I consider them the best remedies we can possibly use in the canals of teeth. The objection the paper makes to them I consider a most desirable result. I consider it especially important that all the material in the canaliculi of the dentine should be coagulated, as soon as a canal is opened, if it is possible to do it. In the treatment of abscesses I always use and have for many years used coagulating remedies. I have treated abscesses in the manner in which I now do, certainly for fifteen years. It is some fifteen or twenty years ago that a gentleman in our State society made the statement that there was no material in the whole pharmacopeia that, in his opinion, was so valuable in the hands of the dentist as chlorid of zinc, and I believe he was right. I believe there is no material that will accomplish the work so thoroughly as chlorid of zinc will in the treatment of alveolar abscesses. I treat the abscess and fill the tooth at once; and it is so seldom that a failure occurs, that it is hardly worth while mentioning it. Any one can do it. All they have to do is to follow the directions, and I will assure them that they will not fail once in a hundred times. If that is not sufficient scientific treatment, then I have nothing further to say.

DR. PATTERSON: It does seem to me that any one who, years

after, has had to examine a tooth filled in the manner described by Dr. Abbott, without any care to disinfect the zone of putrefaction, must be satisfied that Dr. Abbott's method is an incorrect one. Every one here has seen such teeth, when they are extracted, or when, as we often have to do, we have cut into the dentine of such a tooth remaining in the mouth. The condition in which we then find such an unsterilized tooth ought to satisfy any reasonable mind that Dr. Abbott's method is incorrect, that there must be time and the proper medicine, the proper diffusible medicine to penetrate to all points of that zone. If it is not done, we find this deplorable condition when we afterward cut into it. The odor will reach your nostrils some distance away; whereas, if you treat that dentine by modern methods of which we approve to-day, and cut into it years afterward, you will not find the condition which you will find in the other case. This practical way of finding out the condition of the dentine after it has been treated in one way, and then in the other way, certainly satisfies me that the method of not paying any particular attention to sterilizing the dentine is the incorrect one, and must ever remain the incorrect one. Many of the low-grade troubles which we find around the tooth in after-years must, in my opinion, result from leaving the dentine in that condition. I cannot conceive how it can be otherwise, and when we can sterilize it according to modern methods,—according to the method described by Dr. Wassall in his admirable paper,—why should we take any risk? It appeals to my common sense, and I do not propose to take any risk, because my experience has proved that it is a risk. My examination of those teeth that have not been treated by the modern method has convinced me that they are in a condition that will absolutely, in nine cases out of ten, cause some pericemental trouble at some future time.

DR. MORGAN: I wish to correct some assumptions which have been made with regard to our present treatment being a modern one. When I was a student, in 1847, I saw teeth treated in a clinic room by Professor Harris very much after the style that they are treated to-day, except that immediate root-filling was practiced. We followed those cases up to some extent, and had an opportunity to do so in the clinic room. The difference between the treatment then and now, in the main, was that the root-canals were largely opened and drilled out as far as it was possible to do so. An antiseptic was then used, and the canals were immediately filled. Now, if you will go back and examine the old *American Journal of Dental Science*

of about 1854 or 1855, you will find a series of articles by Dr. Charles W. Ballard, of London, England, in which the main basal treatment that is followed now is laid down positively, clearly, and distinctly. He opened up the cavities and root-canals as far as he could, drilling them out very largely. Perhaps it was not done with the intention of removing so much of the animal portion, the soft tissues, as he did, but that was a benefit in that respect, because you had that material out of the way. Then he treated with antiseptics, exactly upon the principle on which such teeth are treated now. He used threads of floss silk saturated with an antiseptic, with which he filled the canal, hermetically sealing it in. In the course of a few days he examined to see what the result was. His test was the test of odor. He was in the habit of treating those teeth ten, twelve, fifteen, or twenty days, and then filling them as far as he could with gold, for he used no other material. That sort of practice has been followed from that day to this, and if I had here two or three patients from the city of Nashville, I could show you teeth in at least two mouths that were filled forty-one, forty-two, or forty-three years ago, after having been treated in this manner, which teeth are intact to-day and doing good service.

One of the most important matters in connection with the treatment of these teeth is the differentiation as to the normal or abnormal tendencies in the patient. In patients of good, sound constitutions, the bilious temperament as we call it, the teeth are retained much better and much longer, and there is much less liability of inflammatory action. But with scrofulous patients there will be much more trouble in getting their teeth into a proper condition to fill satisfactorily, and the results will be much less satisfactory as to time. In the case of the colored people in the South, pulpless teeth in their mouths can scarcely be preserved for even a few years. In the case of the mulatto, they can scarcely be preserved at all after the pulp has become devitalized. They take on inflammatory conditions much more easily, which run their course more rapidly, and the results are much more grave. I have been practicing dentistry for over fifty years, and all that while in a country where there was a large negro population, perhaps one-third. I have in that time seen two mulattoes who had sound sets of teeth at the age of twenty-one years; just two and no more. You cannot find them. They are not there. Such is the predisposition to disease where there is mixed blood. In our race those who are inclined to scrofulous diseases

have as a rule much softer teeth, and more care is required in their treatment in order to preserve them, and a closer differentiation between those that may be preserved and those that cannot be preserved. Those of you who have spoken of this antiseptic treatment as modern, I ask you to hunt up your old journals and see what Dr. Ballard had to say on this subject, which was the outgrowth of his education as he got it in the old Baltimore College. True, a great many things have developed since, and we are using scarcely any of the antiseptics that were used in that day, and we have made large progress in that direction. There has been a great diffusion of knowledge on the subject, which has widened this field of usefulness to our profession very largely; but I assure you that, in the main, that which my friend called modern treatment, and which has been again and again called modern treatment, is not modern in the sense that it has originated within the course of a few years. It was pursued fifty years ago.

DR. PATTERSON: The only thing which I intended, in speaking of modern methods as compared to old methods, was to refer to the fact, not that the antiseptics we now use were not used then, but that we now use the diffusible antiseptics instead of the escharotics and coagulants.

DR. MORGAN: Oh, yes; creasote was mainly used as an antiseptic at the time I speak of.

DR. ABBOTT: Just one word in answer to a remark that has been made. My friend from Kansas City (Dr. Patterson) states that if you open one of these teeth treated in this manner, you get a very disagreeable odor. I suppose I have treated more teeth in this manner than any other man in this room, or any other man in America, and I have yet to see one canal that has been properly filled with oxychlorid of zinc that, when opened, gave out an odor, one month, one year, or one decade afterward. It is the proper treatment and filling of the canals that makes the difference.

DR. BARRETT: There is an old aphorism which, it seems to me, is especially applicable to dental practice, and it is *in medio tutissimus ibis*, the middle course is best. I believe that to be especially true of the subject now under consideration. The paper was mainly devoted to the septic conditions of dentine, not of pulp-canals, and the contents of the dentinal tubuli. Now, they are all of an albuminoid character. They are partially unorganized tissue. In my practice the fact that the remedy which I propose to employ belongs

or does not belong to the class of coagulants is not that which determines my use of it, because the albuminoid contents of the dentinal tubuli will coagulate whether you use a distinctly coagulating agent or not. This coagulation is the primary step in the breaking down or melting out from the dentinal tubuli of their protoplasmic contents, and when once they have melted out, which they will do, with or without the presence of putrefactive micro-organisms, I fear not for any putrefactive material which can possibly find its entrance into these exceedingly minute canals. It is utterly impossible that there shall pass into them sufficient material to produce any particular effect through any degenerative conditions which can possibly occur within them. Hence, the septic condition of the dentine tubule—understand me, of the dentine itself—does not worry me in the least. If I can but seal the mouths of the tubuli, that is all I care to do, because the material at that time remaining in the dentinal tubuli is so exceedingly minute that it can by no possibility do any harm. The probability or possibility of its passing through the interglobular spaces and emerging upon the surface of the cementum to irritate the pericementum is so remote that it need not be taken into consideration. Having sealed the mouths of the dentinal tubuli, I will take my chances on the rest of it. This teaching is too far-fetched, it seems to me ; it is going into speculative philosophy a little too deep. We all of us want to be devoted to our first best. There are enough men in the dental profession who are given to the second best, but we must mark the limits of practicability and of practicality in our work, in our reading, and in our teaching, and I think we are going too far and are neglecting more important things when we descend into these minutiæ. There is a middle ground then, I think, between that which is called the want of scientific treatment, as recommended by Professor Abbott, and the exceedingly minute attention which is given to the subject in the paper. I am quite willing and ready to admit that the *safe* side is that to which the most attention is given, and yet, gentlemen, life is short, and I tell you there is a little too much of other things in our practice for us to give up all of our attention to these minute dentinal tubuli when the source of infection lies in the pulp-canal. I believe that every man who practices dentistry should do the best he can. I believe that every man is normally so constituted that he will do his best, that honesty is the normal condition of mankind, and that until we have been badly instructed and our teaching has become

evil, until by precept and example we have seized upon and adopted bad habits, we will remain honest and choose that which is the best. And so I believe that the best sense of the profession is in the line of that which is safest,—of the medium course,—eschewing upon the one hand the totally unscientific and upon the other hand this fine splitting of hairs, which is incomprehensible to the average dentist. And yet, as one of those who desire the highest, I can heartily commend this paper. It is exactly in the line of my own desires and wishes to see the best possible attained. So the paper is heartily to be commended; but I think we are frittering away our energies when we spend them altogether upon the consideration of things which are too impracticable to be applicable to the general every-day work of the ordinary dentist.

DR. RHEIN: While I am in hearty sympathy with the object and tenor of the paper, and while it represents to us the present scientific aspect in reference to the septic conditions that we meet with in root-canals, yet as the author of the paper has seen fit to speak of a paper of mine in reference to this subject, which I read last December before the Second District Society at Brooklyn, I feel it incumbent upon me to take issue with him in reference to the statement of what he calls the coagulating material that I there recommend for washing out the canals after they have been thoroughly cleansed. Now, on this question of the use of coagulants or non-coagulants I coincide very heartily with the remarks of Dr. Barrett; that is, while theoretically the use of non-coagulants seems to be the proper thing, yet taking this subject into actual practice, clinically, we are met by facts which show us that this is one of those theories which is very much overdrawn, and that the actual facts do not follow out the strict line of theorizing. In other words, the much-mooted assertion that a coagulant is a barrier to the further coagulation of the tissue beyond has been disproven so effectually and so frequently that to my mind it has ceased to exist as a fact. At the same time I am ready to admit that it is a barrier to the diffusibility of antiseptic remedies that we wish to diffuse through the tubuli. But the author makes a mistake when he says that a solution of bichlorid of mercury dissolved in peroxid of hydrogen, which always has a certain proportion of muriatic or sulfuric acid in it, is a coagulant. The fact of the amount of acidity in the peroxid of hydrogen at once nullifies the coagulating properties of the bichlorid of mercury, and this fact seems to have escaped the attention of the author. Now, he has

made a decided objection, in his paper, to the use of what is known as the Schreier material, or rather, as he puts it, the Schreier method, the mixture of potassium and sodium. I agree heartily with his remarks wherein he objects to the treatment as outlined by Schreier, which is merely inoculating the putrid pulp with this material, and not removing it; but for my part I have found no method so effective for removing every portion of pulp-tissue to the ends of the minutest roots, and for penetrating some distance into the tubuli of the periphery of the root-canal, as this mixture of potassium and sodium. There is no reason why we should avoid a good thing because the originator of it has gone a certain distance and stopped there. The only thing necessary to do after thoroughly inoculating the putrid mass with this admirable mixture of potash and sodium is to thoroughly remove the material which has been left behind. The powerful effect of the potash and sodium leaves the periphery of the canal in such a state that the tubuli are to a great extent opened, more so than by any other method of cleansing the root-canals that I have been familiar with; and the syringing out of that canal, after the contents have been removed, with a solution of bichlorid of mercury in a solution of peroxid of hydrogen, which, as I said, is not a coagulating fluid, causes the penetration of the tubuli to a very great extent by a most powerful germicidal remedy. Now, if the condition of that root—and I quote as nearly as possible from the paper which the author spoke of—has been so putrescent, or there has been so much trouble beyond the end of the root as to warrant it, a dressing of a diffusible oil, like the oil of cinnamon, is left in that root-canal for a few days. It will diffuse through the tubuli in such a root in a much more rapid manner than under any other treatment that I am acquainted with. I recall a case of that kind where I received marked evidence, from a member of my own family, of the cinnamon oil penetrating through the cementum of the root so that the taste of it in the mouth was most evident forty-eight hours after the cinnamon oil had been placed in the root-canal.

The point that I wished to make in this matter was that this treatment which Dr. Wassall claims is a coagulating treatment, preventing diffusion, on the contrary increases the rapidity of the diffusion of an essential oil through the dentinal tubuli.

DR. WASSALL: Dr. Abbott seems to think there is no method which could be entirely successful in checking putrefaction, or in preventing recurrence of trouble. That may be true, but the method

which is most efficient is the one we should adopt, and it is a matter for us to decide for ourselves by a careful study of the question which method *is* the most efficient. He claims that he gets perfect antisepsis of the body of the dentine, of the contents of the tubules, by the use of sublimate. I merely wish to call his attention to a point which he probably overlooked in the paper, that sublimate is precipitated in the presence of albumen, and is therefore inert. This point also applies to the claims of Dr. Rhein. Dr. Rhein does get a penetrating disinfectant in using his combination of peroxid and sublimate; because, although the sublimate may be precipitated, there is a penetration of the peroxid, and the good results which he gets from the combination probably depend upon the peroxid alone.

As regards the point made by Dr. Patterson, that the removal of an oxychlorid filling from a root gives an odor, or reveals an odor—

DR. PATTERSON: If any one made that remark, I did not. That was not my remark.

DR. WASSALL: I understood you to say that.

DR. ABBOTT: He said from a root that had been filled at once.

DR. WASSALL: The point has been made by some one that the removal of an oxychlorid root-filling, even after the use of a disinfectant, would reveal a bad odor. And while Dr. Abbott claims not to have these results in the cases that he himself treats, I think it is due to his peculiar skill; because I know I have removed a great many such root-fillings made by others, and have detected the bad odor. In such cases, I am satisfied that if the canal had been treated for a long enough period of time with diffusive disinfectants, this condition would have been entirely overcome, and the result would have been a great deal more permanent.

Dr. Barrett thinks that the putrefactive matter which occupies the tubules is a substance which may be ignored; that the anatomical difficulties which the interglobular space offers to the passage of putrefactive matter from the tubules to the dentine is sufficient. I have dwelt very strongly on that point in my paper. I am convinced by observation that in a great many teeth that have been filled perfectly, so far as their roots are concerned, there is soreness of the tooth in its socket, and I am convinced from my own experience that this is caused by putrid matter in the tubules, which, we are told, is exceedingly poisonous when it decomposes to the extent of forming ptomaines. Dr. Rhein himself tells us how easy it is for the oil of cinnamon to be detected entirely through the dentine, cementum, and

gum, even to be tasted in the mouth. How easy it is, then, for these exceedingly poisonous substances to also penetrate through these tissues.

DR. MORGAN: May I be permitted to ask a question? Upon the assumption that the soft tissues in the tooth may be so thoroughly brought under the influence of antiseptics as never to take on putrefactive decomposition again, upon what ground do you insist upon the removal of even the pulp of the tooth after it is so antisepticized?

DR. WASSALL: I am talking about putrid organic matter in the tubules, as I said, where it is broken down into peptones, ptomaines, and other alkaloids, forming a soft, watery mass. Such substances cannot be mummified. It might be possible to mummify a pulp which was not putrid, which was intact and uninfected. I do not think decomposed materials ought to remain in the tubules, but that they ought to be removed. They are removed by a constant application of dressings, over a period of eight, ten, twelve, or twenty days, in the root-canal, by a process of osmosis. Put a dressing in the root-canal even after the canal-contents have been removed perfectly. Four days afterward take out that dressing, and it is discolored. The discoloration is not matter that was in the pulp-canal, but it is matter which has by osmosis come from the tubules. Under the law of osmosis the drug which was on the dressing would pass into the tubules; so that after the lapse of sufficient time the tubules would be occupied by the antiseptic, and the putrefied material would have entirely disappeared.

SECTION VI.

PHYSIOLOGY AND ETIOLOGY.

REPORT BY J. D. PATTERSON, CHAIRMAN.

THE committee in preparation for this meeting has, through its secretary, Dr. L. E. Custer, solicited from the members of the committee and others, contributions upon the subjects embraced in the Section, but with negative results. Two papers only have been presented, and as they did not bring out original or valuable theories or investigations, they were not deemed of sufficient value to present to the main body.

In looking over the literature of the profession of the past year as it referred to etiology and physiology, your chairman decided to occupy the time at his disposal in pointing out new light which has been brought forward upon the etiology of pyorrhea alveolaris.

It would scarcely be more than repetition of what has been presented to this Association if attention were directed to the continued discussion of the well-known claims of those who argue that the uric-acid diathesis is the chief factor in the etiology of this disease; but instead we desire to call attention to new arguments in opposition to this theory, and also to notice new theories in relation to the disease in question.

In a paper read before the Minnesota State Dental Society, September, 1895, by V. A. Gudex, M.D., D.D.S. (*Dental Review*, January, 1896), the author argues against the uric-acid theory, and attributes attacks of pyorrhea to anemia and imperfect tissue nutrition. He says,—

"Is uric acid the cause of rheumatism or pyorrhea? The agitators of the uric acid cause have never attempted to explain this question, but simply assumed it is an established fact. Where they obtained their authority I absolutely do not know. But I do know that it is a most extraordinary claim. Persons who have made a life study of this disease, and have written volumes on its symptoms, diagnosis, and treatment, say they do not know the cause of rheumatism. Not a single modern author on practice of medicine claims to know the originator of this ailment, and all research in the bacteriological laboratory does not better things much.

"Rheumatism, according to some authorities, is due to faulty nutrition; others say it is an infection, and then there are a number who say it is both. As examples of diseases due to faulty metabolism may be mentioned eczema, urticaria, impetigo, erythema, inflammatory condition affecting the mucous membrane of the respiratory passages, chronic acid dyspepsia, congestion of the liver, lithiasis, hemorrhoids, neuralgia, hemicrania, congestive headaches, gout, all forms of rheumatism, rickets, scurvy, diabetes, obesity, and polyuria.

"Imperfect tissue metabolism as well as the oxidations of the different foods result in the formation of the following acids and substances: uric, hippuric, oxalic, carbonic, lactic, and lactates, caprylic, caproic, valerianic, butyric, propionic, acetic, stearic, oleic, palmitic, formic, cholalic, taurilic, damaluric, damalic, and succinic acids, etc. . . .

"The triphosphate of calcium of the tissues yields two equivalents of calcium which combine with oxalic acid, and the remaining acid phosphate of calcium passes, in state of solution, out of the tissues, and is eliminated in the urine. Hence, heavy deposits of the phosphates in the urine denote active tissue waste.*

"Here are twenty acids due to the same cause, with carbonic acid and uric acid as the least harmful, and lactic and oxalic acids balancing the other side of the scale.

"Now in the face of all these facts a man who can defiantly and positively say uric acid in and of itself can produce rheumatism or pyorrhea, ought to readily pass for a near relative to the fellow who could hear the grass grow. . . .

"The same is true with pyorrhea. The acid dyscrasia is not a cause, but like every other debilitating condition, it may be regarded one of the etiological factors.

* American Text-Book of Theory and Practice, vol. ii, page 73.

"Another misunderstanding is with the formation of calculi in pyorrhea. This certainly must be a result and not a cause, unless some one can prove that the formation here is altogether different from those formed in other parts of the body. Calculi are not formed unless a foundation is laid on some nucleus, a cavity, inflamed or degenerated tissue, or some foreign substance lodging at some given point around which the deposits settle. . . . Large quantities of uric-acid crystals are found in the kidneys of the new-born, yet this condition is not considered to be of any pathological significance. . . . The murexid test showed uric acid on the peridental membrane in two cases of sound teeth that I had extracted of healthy children for correction of irregularity."

I will now ask your attention to brief extracts from a paper by Dr. M. L. Rhein, of New York (*Cosmos*, June, 1896), upon the "Oral Expressions of Malnutrition." He says,—

"It is very significant that the earliest manifestations resulting from malnutrition are noticed about the pericemental tissues. The gums and peridental membrane being fed by about the most remote portion of the blood tracts, it is no more than reasonable to suppose that these organs should be the first to exhibit symptoms of a lack of nourishment in their elemental corpuscles."

He cites the recent work of Levison, with conclusions as follows:

"First. Uric acid is formed in the body by the disintegration of the albuminous substances of its tissues, especially of the nuclein or nucleins.

"Second. The excretion of uric acid becomes increased or diminished by all factors (diseases, medicines, poisons, etc.) which give rise to a more rapid or slower disintegration of the cellular elements of the body, and especially of the leucocytes.

"Third. The taking of food, especially flesh food, causes a temporary leucocytosis (digestive). This leucocytosis probably arises from the nuclein of the food.

"Fourth. The amount of uric acid excreted in twenty-four hours is not influenced to a great extent by food. There is, however, this distinction noticeable: the easily digestible animal albumens set up digestive leucocytosis and formation of uric acid much quicker than the vegetable albumens, which are difficult to digest.

"If these investigations are of any value, they certainly show that uric-acid excess is a concomitant, not only of gout, but of various diseases, poisons, drugs, and nervous shocks. . . .

"Great importance is attached to this point in our field of work, in order to dispel the illusion that in persons affected with pyorrhea alveolaris, or erosion, where the trouble appears to be due to an increased amount of uric acid in the blood, it necessarily follows that the patient has gout. He may just as likely be suffering from tuberculosis, pneumonia, Bright's disease, neurasthenia, or perchance be under the toxic effect of some powerful drug. . . .

"The practical object of this paper is to emphasize the fact that the uric-acid dyscrasia can be associated with almost any disease accompanied by malnutrition. . . . Careful clinical observation has demonstrated to me the fact that, according to the character of the primal cause, the appearance of the inflamed gums and the character of the deposits and exudations will vary greatly, as well as the symptoms expressed by the patient. My observations on these variations are not so thorough that I can at present classify them according to their individual diseases, but I wish to have recorded the statement that the physical condition of the peridental tissues can become a great aid in differential diagnosis."

This synopsis which we give of two contributions to the etiology of this universal disease, which have appeared since our last meeting, cannot fail to attract the attention of members of this Association, and should invite discussion upon their merit. The arguments offered have the true scientific timber, and are free from vague assertion.

SECTION VII.

ANATOMY, PATHOLOGY, AND SURGERY.

The Orbicularis Oris and the Muscles of Expression.

BY W. C. BARRETT, OF THE SECTION.

THERE are a thousand millions of people living upon the earth, and no two of them resemble each other so closely that they cannot be distinguished. The characteristic differences are mainly found in the facial features, and in them the diversities are produced, partially by modifications of the facial and cranial bones, but more especially by variations in the development of the facial muscles, the most expressive of which is the orbicularis oris.

It follows, then, that our principal means for the identification of our friends and acquaintances is in the special development and functional action of this, the most wonderful of all the muscles of the body. When we consider the marvelous diversity of the expressions which the human countenance can assume, when we remember that pleasure, grief, rage, scorn, love, indifference, pride, jealousy, devotion, elation, melancholy, fear, hate, hope, and a hundred other sentiments and passions, with all their modifications, can be clearly and unmistakably expressed by mere contractions and relaxations of these muscles, we begin to comprehend something of the amazing variety of the combinations that may be formed by their union. The more compound a set of muscles, the greater the range of its mobility; usually, however, at the expense of its muscular power. Even the features of the stolid, unimpressionable, phlegmatic boor clearly present at times of excitement the workings of his uneducated, un-

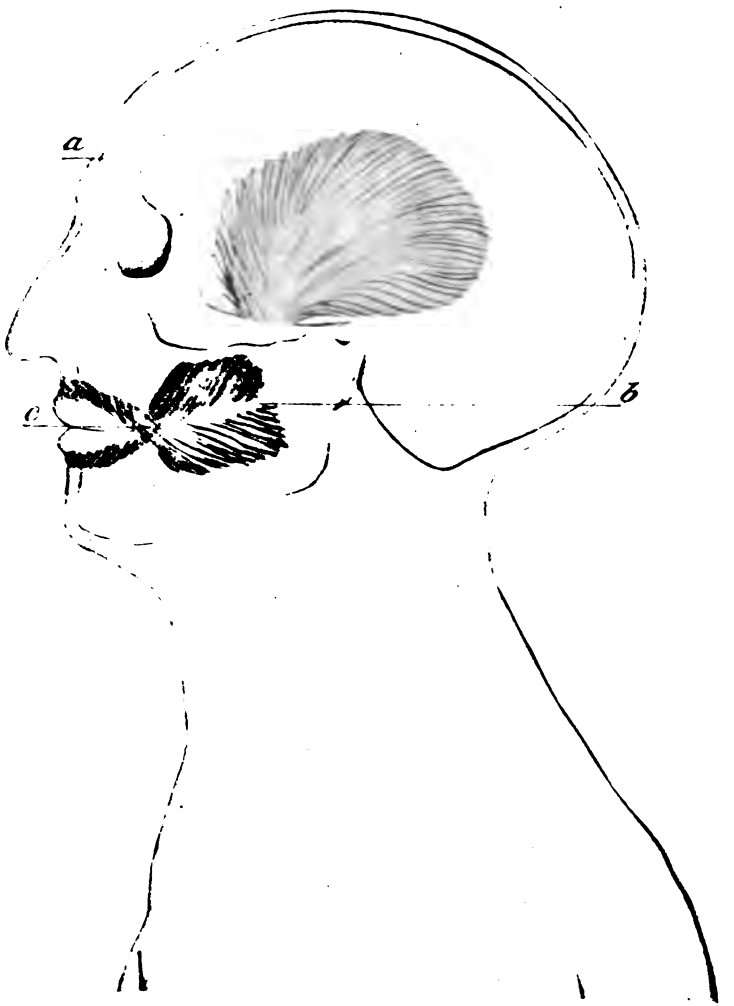
trained mind. When we compare with this the language in which the muscles of the trained pantomimist speak, we get a glimpse of their capabilities.

Nor is it alone upon the voluntary muscular contractions that the actor relies for the portrayal of human emotions. He uses appliances for the mechanical distortion of them, that he may the more readily assume special expressions. It is well known that the tragedian and the comedian introduce material into the mouth for the distention of certain muscles, holding them in permanent distortion in their "make up," that by the action of certain other muscles in combination with them exaggerated expressions may be produced. An invisible hair or thread is used to draw up or down certain facial attachments, thus to produce some special combination. Men so disguise themselves by artificial means that they are not readily recognized by their friends. Criminals, by certain very simple surgical operations, so alter their whole expression that detectives are unable to identify them. Squint, or cross-eye, can be produced or obliterated almost at will. Slight permanent contractions of certain muscles can be induced by simple operative procedures that shall entirely change the expression of the whole face. We, as dentists, know the marvelous modifications that can be brought about through a change in the position of the teeth. We have witnessed the complete mutilation that has been caused by the insertion of an unskillfully constructed artificial denture. I could not, then, select a subject that should more directly appeal to those who are constantly engaged in working upon the human face, than to present before them a brief study of one of these expressive organs.

The orbicularis oris is the most complicated and involved of the muscles of the human body, whether we consider it from its anatomical or functional aspect. It is commonly considered a sphincter, but it is very far removed from this class, in that none of its fibers are continuous about the cavity which it surrounds. It is not a simple muscle, but is made up by the intermingling and intercommunicating of a large number of facial muscles. In fact, the distinctive fibers of the orbicularis are comparatively few, passing only across the lips, and not around them. The compression of the mouth is not even produced as in the eye, in which the orbicularis palpebrarum passes nearly around. The mouth cannot be completely pursed up, as with a true sphincter, but it can be drawn together by the combined action of a considerable number of muscles. Its expressive-

ness is not produced by a simple muscular action, nor can any of the passions be portrayed by any one set of fibers. The marvelous

FIG. 1.



THE BUCCINATOR.—It is impossible to clearly delineate this in connection with the other deeper muscles that meet at the angle of the mouth.
a, Temporalis; *b*, Buccinator; *c*, Decussating fibers.

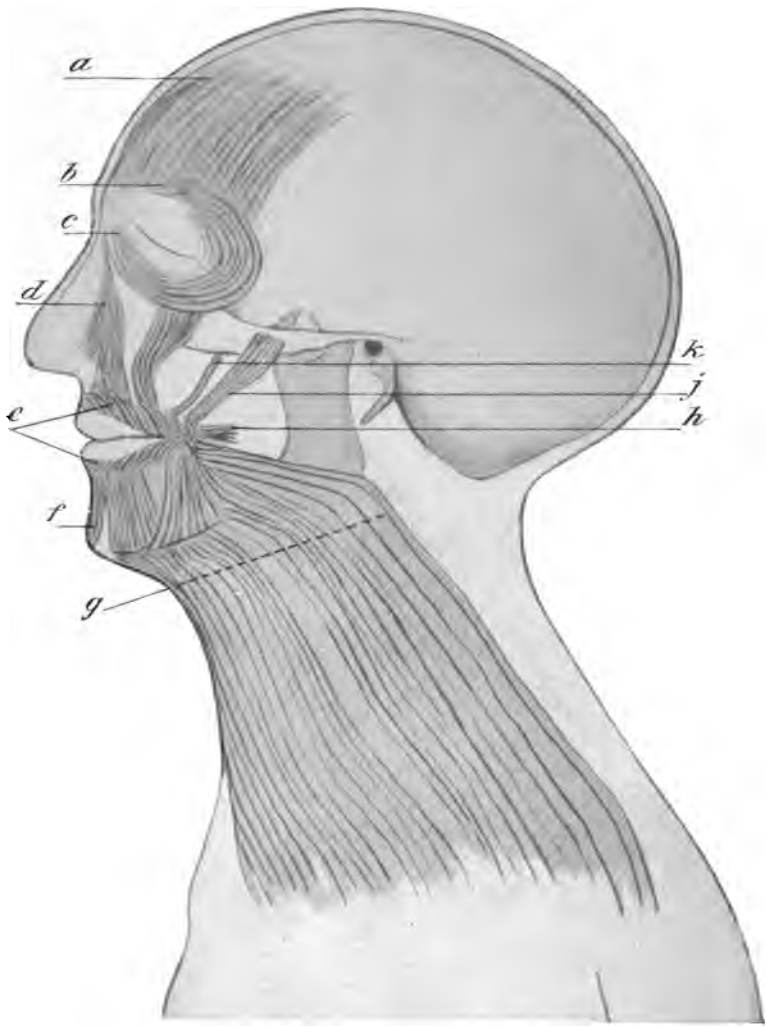
changes are brought about by combinations made possible through the intercommunication already referred to.

The orbicularis oris is the common meeting ground of all the muscles of facial expression. Fibers from each and every one of them communicate, either primarily or secondarily, with the true orbicular fibers. Even the muscular portion of such a distant one as the occipito-frontalis has its means of communication, and from the clavicle to the coronal suture there is a functional union of all the expressive muscles of the face and head. The mingling of the fibers of all these muscles makes the structure of the orbicularis very complex. Muscles like the depressors and the levators, the filaments of which are arranged at right angles to the margins of the lips, crossing it, give vertical fibers. Those of the buccinator, the risorius, etc., added to the longitudinal fibers of the orbicularis proper, furnish transverse filaments, while a third set run diagonally across, obliquely between the other bundles, from before backward, and from the skin to the internal mucous membrane.

The muscle, as a whole, may be divided into the internal or labial, and the external or facial portions, according to whether the layers are mainly composed of the fibers of the superficial or deep muscles, but no accurate line of demarkation can be drawn, because of the diagonal fibers that interlace. The deep portion has but a restricted attachment to the bone beneath, that of the upper lip having the naso-labial slips, which give the prominence that forms the two vertical ridges near its center, dropping down from the cartilage of the nose, and another in the incisive fossa, while that of the lower lip is merely attached at the incisive fossa on each side. The superficial part of the muscle has no bony attachment whatever, but is held in position by the diverging muscles of which it is composed. This gives extreme mobility to the whole mouth, the lack of bony attachment accentuating it, for if the superficial fibers are strongly contracted and the diagonal ones relaxed, the lips are protruded, while if the deeper layers and the oblique ones are contracted, the lips are drawn against the teeth.

The buccinator belongs to the deeper layer, and its fibers decussating, or crossing at the angles of the mouth, make up a considerable part of the transverse portion of the orbicularis. It has its origin along the distal line of the alveolar process of both the upper and the lower jaws, and in the pterygo-maxillary ligament behind, many of the fibers from the upper part crossing and forming a part of the orbicularis below, while those of the inferior part cross to be inserted in the upper lip. These decussating fibers are attached to the alveolus

FIG. 2.



a, Occipito-frontalis; *b*, Corrugator supercilii; *c*, Orbicularis palpebrarum; *d*, Levator labii superioris alæque nasi; *e*, Fibers of orbicularis oris; *f*, Levator menti; *g*, Fibers of platysma myoides; *h*, Part of risorius; *j*, Zygomaticus major; *k*, Zygomaticus minor.

This cut shows that the orbicularis oris is directly connected with all the muscles of expression. From the pectoralis major to the occipito-frontalis all send it fibers, either directly or indirectly.

as far forward as the margin of the canine fossa, and they should dominate the shape of any artificial denture at this point.

The levator anguli oris, the levator menti, and the quadratus menti, belong to the intermediate layer, while the levator labii proprius, the zygomaticus major and minor, the triangularis menti, the risorius, and the levator labii superioris alæque nasi, with the fibers of the platysma myoides, make up the superficial layer. But certain fibers of nearly all these muscles cross and, accompanied by portions of the deep fascia, penetrate even to bony attachments.

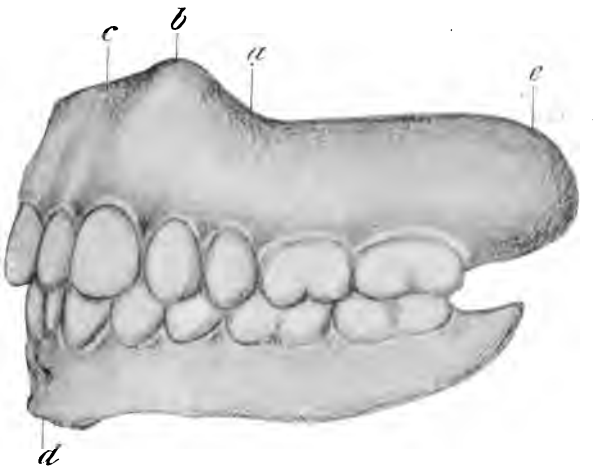
It is not, however, the anatomy of these muscles that so much interests us as their function, and I desire to indicate in what way the expression of the countenance may be affected by malpositions of the teeth, or by unskillful operations on the part of the dentist.

First let us consider the levator labii superioris alæque nasi. The action of this muscle is to raise and slightly evert the inner half of the lip, and at the same time to lift the wing of the nose, and it produces an expression of disgust. It is especially used in sneering. In certain instances in which the central incisors are especially prominent, while the laterals are retracted, we have that peculiarly impudent and deriding aspect that is sometimes called the "squirrel-," or "rat-face." If an artificial plate be too prominent beneath it, there may be produced the vacant, idiotic look, induced by the compression of the oblique fibers of the orbicularis oris, and the consequent eversion of the labial edge.

A little nearer the angle of the lips, and above the cuspid teeth, but upon the superficial labial surface, lies the levator labii proprius. The action of this muscle is quite complex. With the levator labii superioris alæque nasi it raises the lip, everts it somewhat, and gives a peculiar petulant expression to the countenance. The carnivora in snarling bring this muscle into play, and thus expose the cuspid teeth. In connection with the depressor anguli oris, or triangularis menti, and the orbicularis palpebrarum, it is especially used in crying. The closure of the eye by the contraction of the latter muscle assists in raising the lip, while the triangularis menti draws the mouth into the shape of a parallelogram, and gives a peculiarly lugubrious expression to the face. If the cuspids are unduly prominent, or if a plate lifts the muscle too much, the consequence may be, when the other muscles are at rest, a permanent sneer. With the contraction of the orbicularis palpebrarum and the triangularis menti, the face has an expression of extreme sadness.

The buccinator as a muscle of expression acts secondarily. From the peculiar direction of its fibers, when it is in contraction, the muscles of the deep layer are pursed up at the corners of the mouth, while those of the more superficial layer are peculiarly puckered by the consequent drawing of the levator and depressor anguli oris; a deep wrinkle is seen at the angle, while the risorius is placed upon a stretch, and an insincere and mocking appearance is the result. This will be induced when an artificial denture is inserted that has no depression at the canine fossa. The superior decussating fibers of the buccinator are placed upon a stretch, and a specially disagree-

FIG. 3.



ARTIFICIAL TEETH CONSTRUCTED SO AS TO ALLOW FREE MUSCULAR PLAY.

a, Canine fossa; *b*, Canine eminence; *c*, Incisive fossa; *d*, Mental protuberance; *e*, Maxillary tuberosity.

able expression thereby induced. The same abnormality of the natural denture, or the same improperly constructed artificial plate that thus unduly distends the buccinator, will act upon the levator anguli oris and intensify the disfigurement. This muscle raises the corner of the mouth, and at the same time draws it inward. When too much distended there must be a continued muscular effort on the part of the triangularis menti to keep the corners of the lips in place, and this results in a painfully strained appearance, and adds to the distortion.

The zygomatici, major and minor, are the muscles most used in

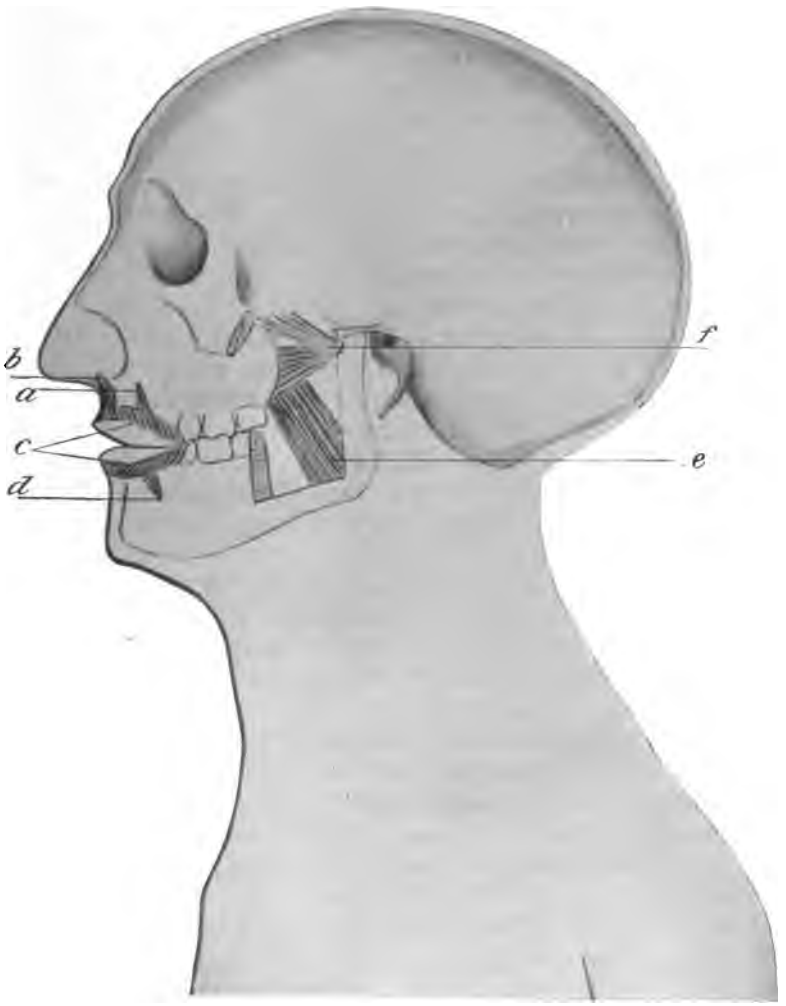
smiling, as they draw the angle of the mouth upward and outward. When the zygomaticus major is strongly contracted, it draws together the tissue about the point of its origin, and causes a fullness in front of the malar bone. If now the orbicularis palpebrarum be contracted, the tissue between the origin of the zygomaticus and the outer canthus of the eye is peculiarly wrinkled, producing what are called "crow's feet," a disfigurement which ladies especially most earnestly desire to avoid. If both the zygomatics are placed upon a stretch by undue distention, the mouth is placed upon a perpetual broad grin. If, on the other hand, they are unduly relaxed, the triangularis menti draws down the corners of the mouth, and gives the opposite expression.

The risorius has its origin in the masseter, and its action is to draw the corners of the mouth directly outward. It gets its name from the former supposition that it was the muscle of laughter, but all the late anatomists know that this was a mistake. When it is contracted it gives an expression of pain. This is the case in tetanus, and the appearance in that condition is hence called the "risus sardonicus." If the first molar in either the natural or an artificial denture be placed either within or without the proper position, the risorius may be caused to give a very peculiar and painful expression.

The platysma myoides is not as much affected by the dentition as some of the other muscles. Yet there are few whose action is more complex. Arising as it does from the deep fascia of the upper part of the chest and neck, it is involved in all the muscular movements of the important pectoralis major, the deltoid, and the sterno-cleido-mastoid. Its long bundles of fibers continue to the border of the jaw, where some of them are inserted. But others cross the lower jaw, and, continuing beneath the triangularis and the quadratus menti, are lost in the orbicularis oris, while the fibers crossing the angle of the mouth are mingled with and lost in the fibers of the levator labii proprius and the levator labii superioris alæque nasi. Hence any unusual exertion of the pectorals and the deltoid exhibits itself in the face. In heavy lifting, the corners of the lip are drawn down, and even the wing of the nose depressed by the strain placed upon the platysma, through its origin in the fascia of the muscles of the arm and chest, and its connection with the orbicularis oris and the levator alæ nasi. It cannot, then, be lost sight of in arranging the teeth, and its action upon the orbicularis oris needs careful study by the artistic dentist.

The depressor anguli oris is of course affected by anything that unduly contracts the levator anguli oris and the zygomatics. If, on the other hand, these muscles are left too lax, the depressor, or the

FIG. 4.



THE BONY ATTACHMENTS OF THE ORBICULAR FIBERS.

a, Superior incisive attachment; *b*, Naso-labial slips; *c*, Diagonal fibers; *d*, Inferior incisive attachment; *e*, Internal pterygoid; *f*, External pterygoid.

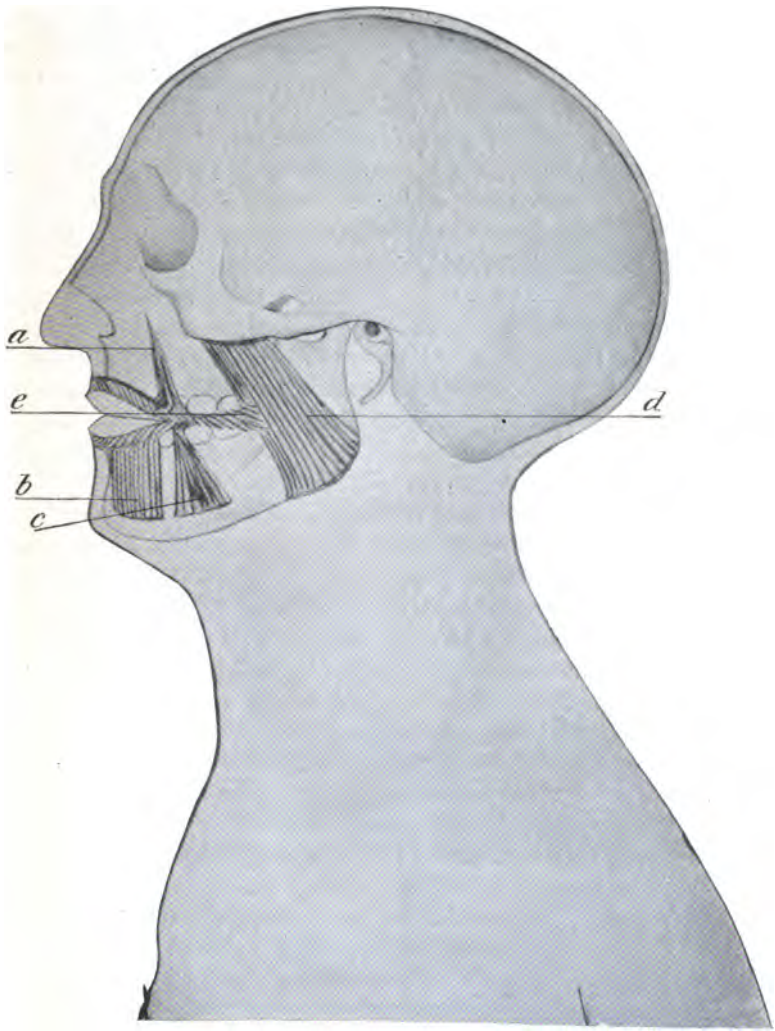
triangularis menti, draws the mouth out of position. If the lower teeth are too prominent, or if a lower artificial denture places these muscles upon a stretch, it may easily be seen that not only will the symmetry and proper expression of the lower lip be destroyed, but that the opposing muscles of the upper lip will draw that also out of place. Especially must the natural expression of the canine fossa be retained, that the triangularis menti may not be distorted, and so the natural expression be entirely lost.

A very disagreeable fullness of the lower lip may be induced if an artificial plate too much distends the quadratus menti, or the depressor labii inferioris, and the levator menti, or levator labii inferioris. If the latter, especially, be strained by undue fullness near the center of the lower lip, it induces a peculiarly haughty, supercilious expression, which may do the wearer of it great injustice. This appearance may be brought about by malposition of the teeth, irrespective of either the natural or the artificial alveolus. If, for instance, the lower edge of an inferior plate be too thick at the incisive fossa, the origin of the levator menti, the point of the chin will be disagreeably drawn up. If now the teeth be placed too far back, the natural fullness of the orbicularis is not preserved, and the decussating fibers of the buccinator and those of the platysma will draw in the margin of the lip, and a peculiarly dogged, obstinate expression will be the consequence.

If a plate be too full at the canine fossa of the upper jaw, the levator anguli oris is distended and the corner of the mouth is raised, while at the same time the descending fibers of the buccinator draw up the inferior angle of the mouth, the risorius is pulled out of position, and a half-sneering, half-weeping expression is seen. At the same time, the zygomatics may be relaxed by the lifting of the lip, and there will be a distortion of the tissues covering the malar bone. Hence, by an artificial denture that has an undue prominence at one point, every expression of the face may be changed, and not a muscle that is connected with the orbicularis oris remain at rest in its natural state.

It would be interesting at this point to take up the comparative muscular anatomy of different orders of animals, and determine the character of each as expressed in the face. There is a peculiar development of the muscles about the mouth of each one, and it is always indicative of their individual or class traits. In the Carnivora, for instance, the levators of the upper lip are largely developed.

FIG. 5.



THE INTERMEDIATE LAYER OF MUSCLES THAT MEET AT THE ANGLE OF THE MOUTH.
a, Levator anguli oris; *b*, Quadratus menti; *c*, Triangularis menti; *d*, Masseter; *e*, Risorius.

This gives them the peculiarly savage expression that is so threatening when the anger of the animal is aroused.

In the Rodentia, the prominence of the central incisors brings the levators proprius into prominence, and gives them the impudent, saucy expression that is characteristic of that order. In the Leporidæ, or hares, this is modified by partial separation of the superior labial muscles, the so-called "hare-lip."

In the Ungulata, the absence of developed cuspids in many of the families of this order is partially compensated for by the peculiar arrangement of the six incisors, while the corners of the mouth are so far back that the angular muscles are partially inactive. Yet the arrangement is plainly observable in the characteristic expression, this order being, except in the case of certain sub-orders, timid and fearful. The presence or absence of the cuspid changes the whole expression, and the horse, which has canine teeth, may by close and experienced observers be distinguished from the mare, which has none. But this study, although intensely interesting, is foreign to the objects of this paper, and I will not enlarge upon it. I could not, however, resist the impulse to advert to it.

I should be glad also to take up at greater length the question of functional anatomy, but time forbids. I can but superficially present my subject at best. As much time should be spent with each of the muscles whose action is in any way connected with that of the orbicularis oris, if we would thoroughly comprehend the matter. The dentist who constructs artificial teeth has in his keeping the making or marring of the whole human face. If he is not an anatomist, and if at the same time he has no artistic ideas, and if he does not as carefully as the sculptor study the face which he is endeavoring to idealize, he is unworthy a place among artistic dentists. When one sees the perverted, distorted, deformed features of some one who might have a pleasant expression; when children, perhaps, look upon a mother from whose hallowed image all the sweetness, and love, and patience, and tenderness have been eliminated by the cursed work of some pretender to knowledge of which he is in utter ignorance; when we reflect upon the blasted lives of young women whose future perhaps is wrecked through their being made repulsive to one who should have been attracted; when we observe upon the streets, in society, at home and abroad, the horrible caricatures of the human face divine that are the result of the reprehensible ignorance of pretended dentists, one wonders whether after all our pro-

fession as a whole brings more of good than evil upon mankind. When we think of what it might be, and of what it is, we are led to weep at the average results of the art of dentistry, and are consoled only by the remembrance that amid all the Cheap Johns who are violently struggling for a bare existence, there are a few who do honor to their profession by conscientious and intelligent work, and who are rewarded, as such men always are, not only with the plaudits of a judicious world, but by the more substantial benefits of well-paid labors.

SECTION VII.—Continued.

A Study of the Relation of the Frontal Sinus to the Antrum.

By THOMAS FILLEBROWN, of the Section.

MY attention was especially called to the relation of the frontal sinus to the antrum some four years ago, by difficulties I met with in inducing a cure in several different cases of empyema of the antrum. In each of these cases the frontal sinus was plainly involved, and seemed to be connected with the cause of the antral trouble.

Several of my troublesome cases were sent to me by a specialist in the treatment of the nose and throat, whose skill they had defied for over two years.

I will briefly describe five cases:

Case 1.—Male, age thirty-eight, right antrum affected.

This patient had suffered from rhinitis for a considerable time, and I think the ethmoidal cells were somewhat affected as well as the right frontal sinus. The patient was radically relieved by operation, and the membrane of the antrum made healthy by treatment, except at the foramen as it entered the meatus of the nose.

Case 2.—Male, age forty-two, a dentist.

Offensive discharge from left nostril for nine years.

I found left antrum filled with pus, region of left frontal sinus swollen and somewhat red and sore. He suffered from constant headache.

My treatment immediately relieved him, and he has been able to keep himself entirely comfortable ever since, and has declined operation on the frontal sinus for a radical cure.

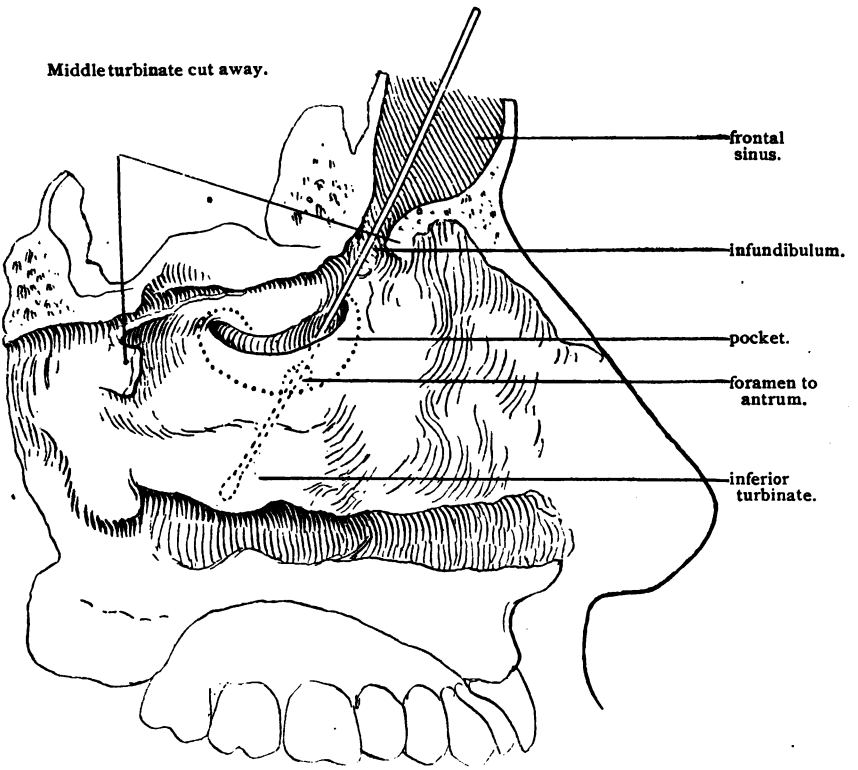
Case 3.—Female, age about thirty.

For two years had offensive discharge from left nostril. In this case discomfort almost amounting to pain, and soreness over the left orbit, told plainly of inflammation in the frontal sinus.

Case 4.—Female, age thirty-two.
Right maxillary and frontal sinuses affected.
Case 5.—Female, age thirty.
Right antrum and frontal sinus involved.

These last two cases exhibited essentially the same symptoms as case 3.

FIG. 1.



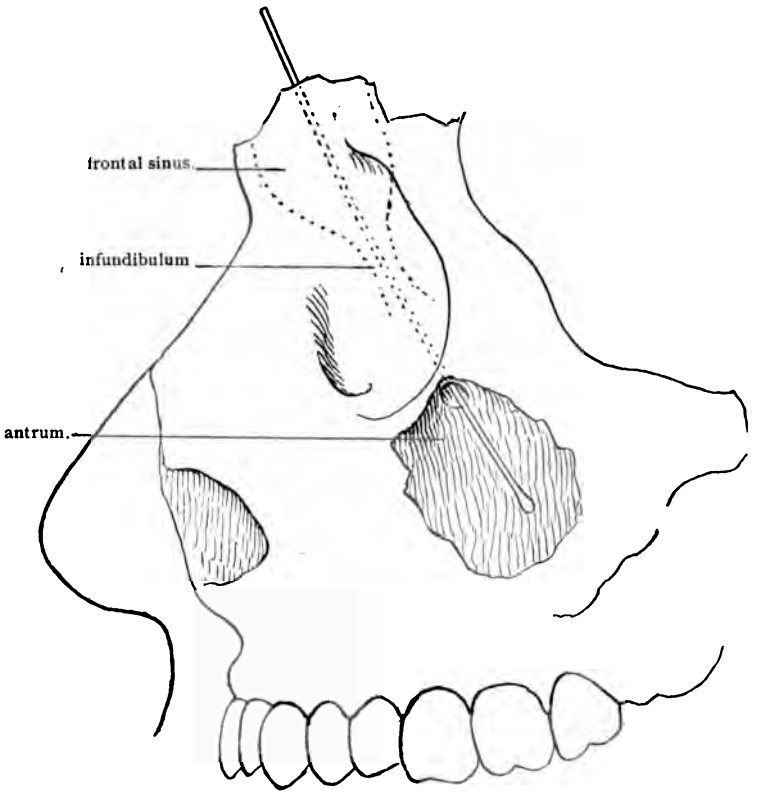
Each of these cases I treated by making a good-sized opening through the region of the tooth-sockets, thus affording drainage from the dependent parts of the cavities. In each case teeth had been lost entirely, or only roots remained, as no teeth had to be sacrificed to permit the operations.

Antrum No. 1 was entered through the socket of the second bicuspid; No. 2, through the second molar region; in No. 3 the absence of

the first bicuspid afforded opportunity; No. 4 was entered through the sockets of the first molar, and No. 5 through the location of the second molar.

I made the openings as large as a common lead pencil, and made a hard rubber plug attached by a clasp to a neighboring tooth to

FIG 2.



keep the artificial canal patulous and render the atmospheric condition normal. The plugs could easily be removed by the patient, and, after cleansing, be as readily replaced.

I have tried both the open tube and the solid plug, and much prefer the latter. It is hardly practical to use a canula large enough to syringe through freely and not also to allow the circulation of air, which is not a natural condition.

The plug being easily removed, both plug and cavity can be washed thoroughly clean. A tube cannot be made clean without much difficulty.

The results in the cases I have described are as follows:

No. 3, cured; has been entirely well for more than a year. No. 5 has steadily gained and is nearly well. No. 4 improved for a year, then sickened and died from other troubles. No. 2, of nine years' standing, keeps himself comfortable, with steady but slow improvement. No. 1 keeps himself comfortable by a daily syringing of the cavity. In each case, with a probe wound with cotton, I could explore the whole cavity and locate any pus-producing spots, or any collection of secretions; and in cases Nos. 1 and 5, by passing the probe through the foramen into the nose, I constantly found pus, which was either secreted at that point or came down from the sinus above. The last I have since found to be entirely probable, as I shall show later.

I have never found any difficulty in inducing a cure of empyema of the antrum in a few weeks, when the cause was of purely dental origin. This being the fact, and the frontal sinus in these cases being so evidently affected, I was led to conclude that there must be a very much more intimate relation between the two cavities than that described by anatomist or surgeon, for I could find neither an anatomist nor a surgeon who could give me the least encouragement that my surmise was correct.

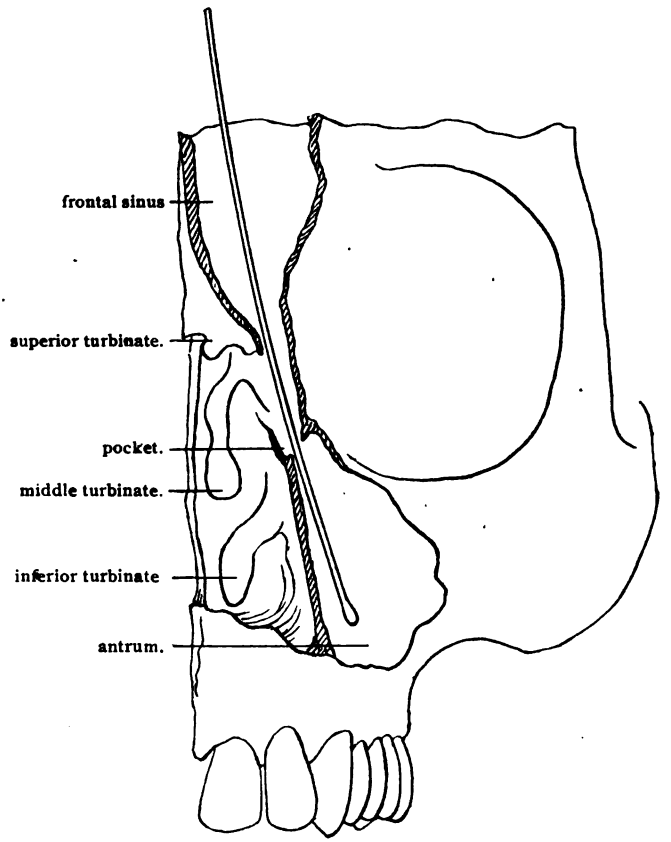
During the past winter I succeeded in verifying my opinion. Professor Dwight, of the Harvard medical faculty, kindly offered me an opportunity to examine several specimens in the Harvard Anatomical Museum, and enabled me to obtain others especially for my purpose, and gave me access to his extensive library.

I believed the infundibulum had some direct connection with the antrum and discharged its secretion directly into it, and an examination of eight different specimens showed that to be the case.

The infundibulum, instead of terminating in the middle meatus, continues as a half-tube, this half-tube terminating directly in the foramen of the maxillary sinus. This was the case in all of the eight specimens, and in seven of the specimens there was a fold of mucous membrane which served as a continuation of the unciform process and reached upward, covering the foramen and forming a pocket which effectually prevented any secretion from the frontal sinus getting into the meatus until the antrum and pocket were full to overflowing.

The pocket I have mentioned has been noticed by a few writers, but has been considered by them as an anomaly. If an anomaly, it is remarkable that I should have found it in seven out of eight specimens obtained at random, where the eighth specimen, in which it is

FIG. 3.



absent, is plainly abnormal, as the foramen is very large and very irregular.

The continuation of the infundibulum is present in every specimen, and if the pocket is abnormal, my examinations show that it exists often enough to presume it to be present in every case where the frontal sinus is affected in conjunction with the antrum and the discharge from the antrum will not cease.

As I remarked before, few have mentioned the physiological connection of the cavities.

Professor Dwight says, in answer to my request, "I have looked the matter up and am convinced that the infundibulum opens most directly into the antrum, and that the common opening of the two into the middle meatus is practically on the inner side of the infundibulum."

Tillaux points out "that if fluid be injected into the frontal sinus, instead of running into the middle meatus it passes in great part into the antrum;" and Merkle describes a fold of mucous membrane under the common opening, and accounts by this for the occurrence described by Tillaux.

Dr. M. H. Cryer mentions in his valuable paper read before this Association last year, that fluid may enter the antrum from the frontal sinus, but he makes no mention of the intimate connection which I have observed.

Professor Harrison Allen, in a paper published in the *Dental Cosmos*, May, 1895, discusses the proliferation of empyema of the frontal sinus into the antrum, and of the coexistence in these cavities of this condition.

Dr. J. H. Bryan, in a paper published in the Transactions of the American Laryngological Association, 1895, mentions the fact of occasional communication between the two sinuses, but considers them anomalies. Further than this, I find no mention of this condition.

As the parts so overlie one another, it is impossible to show their relations by any series of photographs; hence I present drawings made by Mr. J. W. Emerton from the specimens in my possession, having verified their accuracy.

I trust the attention of anatomists may be given to this subject, and specimens enough may be examined to determine whether the above-described conditions be an anomaly or one of the normal arrangements, and in what proportion of cases it occurs.

DISCUSSION.

DR. A. O. HUNT: I only desire to corroborate some of Dr. Barrett's statements in his paper as to the function of the orbicularis oris muscle, and its relations to other muscles of the face. I doubt whether we think enough of the divided function of this muscle. It acts differently in the management of the upper lip from what it does in the management of the lower lip. For instance, in speaking, the upper

lip does not move very much. It is only in extreme cases or in certain individuals that there is any great amount of motion in the action of the upper lip, while in the lower lip the function is increased. To make that clear to you, you will find that you can push the lower lip up beyond and over the upper lip, but you cannot push the upper lip down over the lower one. It is an indication corroborative of the statement of Dr. Barrett that the fibers of the orbicularis oris are not many of them continuous fibers, running directly around the cavity. If any great number of these fibers surrounded the cavity, its function would not be divided in the way in which it is.

Another proof of the function of the muscle is that in lifting the upper lip you cannot do it without at the same time distending it, everting it. If you draw it down, you will invert it. In the region of the levator labii superioris alæque nasi muscle it does not have very much action. It is very nearly in a fixed position. As Dr. Barrett has finally settled his conclusions on the conditions to be reproduced in an artificial denture, I suppose I shall be allowed to particularly refer to it, although it may be under the head of anatomy. Before I go to that, however, you cannot move one muscle of expression of the face without moving all of them. No one can act independently. They can be made to do so, however, by an unusual education or training of some sets of muscles, such as the contortionist employs. Indications of this are found in the habit that is retained in the use of the lips in individuals long after the teeth are lost, the habit being contracted in early life, from an abnormal position of the orbicularis oris, caused by an abnormal position of some one of the teeth. For instance, if in the process of the incoming of the teeth the lateral incisor and cuspid come so closely in contact that the cuspid itself does not get its normal position, standing out of the arch in such a manner that the individual in youth contracts the habit of lifting the corner of the mouth out of the way of the cuspid, which would irritate the lip, that habit will continue through life, and never will be obliterated, even after the loss of the teeth. It is the study not only of the normal function of this muscle, but also of its abnormalities that are likely to be produced in youth, that will lead us to a proper understanding of how to arrange or make artificial dentures in such a manner as to bring harmony to the face. The cuspid tooth, for instance, has a fixed position. The chart showing the elevating muscle proper, and the elevating nasal muscle, should be set a little farther back from the anguli oris. [The doctor here illustrated the position of the various

muscles by referring to Dr. Barrett's charts.] Now, constancy in the position of these muscles is not the rule. Variation of them in position is a very common condition. We may find in the same mouth that the muscles on one side will be in one position, and on the opposite side they may vary from that. So that in studying the effect of the functions of these muscles, we must study them together, for the purposes of education. They do not any of them act separately. This is the point that I desire to impress particularly, that in the study of the question you must take into consideration all the muscles of the face. Whether they are in their normal or abnormal position will also have much to do with the final effect and result. More than that, a general statement perhaps that will be of more value is that in the pleasing emotions all the lines of the face as produced by the muscles are radiating from the central portion of the face upward and outward. In all the disagreeable passions, expressed by the form of the muscle, its lines are downward and inward to the central portion of the face. That is the one general idea that underlies the using of the functions of these muscles for a final result.

I desire to speak of the effect of the restoration of these muscles to a position analogous to that which they normally occupied in the mouth. In an aged person, where the resorption and change of the position of the muscles has been considerable, it is not possible always to restore these features without an extraordinary use of material in the construction of a denture. Dr. Eames, some three or four years ago, made a suggestion which I think, if you will utilize, you will find of considerable value. In extreme resorption it is not alone the alveolar border that resorbs, but the muscles themselves droop. Now, he suggested not only raising this point (referring to the diagram) as high or even higher than you could ordinarily get it with an impression, but at the same time building over it a hood, so to speak, not making the mass of material to correspond to this projection, but simply turning it over in the form of a curve, from the margin of the plate. If you utilize this you will find that the effect of it is simply that it does not restore the features outward, but it lifts the orbicularis oris muscle in this particular region of the cuspid. In doing that it naturally controls all the muscles, and lifts the posterior muscle upward and forward in such a manner that many of the difficulties that we meet with will be overcome. In extreme cases it can even be continued back to the region of the last molar tooth, which will add to the natural effect.

DR. CORYDON PALMER : This subject of restoration and adaptation to the face is one that I have studied. In the early days in 1843 there were no full sets of teeth. There was no first or second bicuspid, and there was no finishing molar. At my suggestion the first finishing molar was made that ever was in existence, and I furnished the model for it. Also teeth were made in entire sets, and the models which I furnished were afterward copied. After that they did furnish us molar teeth that were long enough for the restoration of the features ; the molars were previously too short. There were no teeth long enough to so open the mouth as to give restoration. I furnished to Mr. White my model of thirty-two teeth, carved in boxwood, and from these models were made the first full set of molars of single-gum plate-teeth that were ever produced that were long enough to make a whole set, by giving restoration. In reference to Professor Eames's idea of roofing up and raising the muscle on each side of the nose, and getting the natural expression thereby, he erred in making the restoration hollow. In my study I endeavored to bring back exactly the lost portion, to represent it as perfectly as my art would enable me to do it, and have it prominent where prominence was wanted, and sunken where it should be sunken, and altogether to give the muscles of the face their proper curve to lie in, and so bring out and restore the shape of that which was lost. Now, I am glad of the opportunity to speak of this, and to refer to the early history of these teeth, because what I have done is not in any book ; but the older ones of you that I see about me know what I have done, and I want the younger ones to know that I have given my vital forces and life energies to this work. I have never asked for a dollar for any design or model that I have furnished to the manufacturers, but have brought everything and given it to the Association. Now I have something more that I wish to bring forward, and if you will give me a good audience, I will do so at your pleasure.

DR. BROPHY : What is the nature of the work?

DR. CORYDON PALMER : I want to give it as a surprise.

DR. BROPHY : Which Section would it belong to?

DR. CORYDON PALMER : Operative dentistry. The most important thing that I wished to bring forward in this discussion was that in making your piece restore sunken features, do not make any core, but let it conform to the original shape and form. Study the mouth and exactly reproduce the lost part. Professor Barrett surprised me

by referring to my set of teeth, and I do not want to make a show of myself, but I want you to see that what I say is true. I have a piece in my own mouth, of my own construction, and it is a type. It is the best model to carry out the idea that I have spoken of that there is in existence. I will let you see it if you will pardon me for taking it out of my mouth.

DR. BARRETT: I think this plate will be a revelation to almost any man who will look at it closely.

DR. CORYDON PALMER: Let me say this, gentlemen (exhibiting plate): This piece has been made without ever having a brush put upon it. I trimmed it up and burnished it. I think you can burnish a piece of rubber work and get a great deal better results than you can in any other way. In this piece that I show you, everything is shown that I have been talking to you about.

DR. BARRETT: There is not a muscle that is not allowed for. What pleased me especially was that Dr. Palmer said to me that he had never studied the muscular development, and did not pretend to know the names of half these muscles, but he has got a place for every one of these muscles exactly reproduced, and I will challenge any man to compare it with the chart and see if he does not find it.

DR. BROPHY: The paper that was read by Dr. Fillebrown is a very interesting one, and will excite a great deal of comment, no doubt, among the members of our profession and the medical profession generally. I am convinced that cases of this nature occur far more frequently than we believe. The evacuation of fluids from the frontal sinus into the antrum has, so far as I have been able to ascertain, been little discussed or considered. A case that is now in my hands has shown to me conclusively that such conditions do exist, and that a fine probe may be carried into the antrum and through into the frontal sinus. This has been accomplished, however, only after removing the greater portion of the anterior wall of the antrum, through the canine fossa. The secret of success in curing empyema of the antrum is to thoroughly remove all fluids, pus, and, if such a condition exists, any foreign substance that may be present. In my experience I have found in a number of cases pieces of tooth-roots and other substances that have found their way in through the opening made for the purpose of securing drainage. In the case which I have now in mind, the surgeon who treated the patient by draining the cavity with a flexible rubber tube lost a piece of tubing in the

cavity; and while he believed that it had been lost, that it had escaped from the mouth, it had passed into the cavity of the antrum and remained there for several months, and was a constant source of irritation to the membrane. I removed this piece of rubber, and have had pretty fair success in the treatment of the case, which was an extremely difficult one to control.

The paper read by Dr. Barrett opens up to us new thoughts in the field of prosthetic dentistry, in a careful following of the rules laid down by him in adjusting dentures. This has been most beautifully illustrated in the plate shown by Dr. Palmer. Those of you who will examine the plate will find that it has been cut away wherever necessary to accommodate the muscles. It has been formed in such a way that it will set firmly in place, and its firmness is in great measure due to the relation of muscles to the plate.

DR. ABBOTT: I want to say one word in corroboration of the position taken by Dr. Fillebrown in this matter, that "there is an opening from the frontal sinus into the antrum." I have for a long time believed this to be the case. I have never, however, had an opportunity of examining the anatomy of the parts sufficiently to determine whether that was the case or not. I have had several cases in my hands that have led me to that conclusion.

I do not think the name empyema of the antrum, applied to these cases, is a good one. I call it abscess of the antrum, or an alveolar abscess emptying into the antrum. In the treatment of these cases, I believe with Dr. Brophy that absolute cleanliness is what is needed. But the cleansing is a most difficult process. I have devised a good many instruments for this purpose. As you all know, I have a spray instrument which I use in a great many cases where it is impossible to throw the medicine into the place or places which I wish to reach with a spray syringe. This consists of compressed air with a pressure of some forty pounds. I use a multiple spray that sprays all over the antral cavity at once. In this way I cleanse it very thoroughly indeed. In place of a tube, I use for drainage a mass of cotton wound upon a stick, making a new plug whenever I make the treatment. Still, some men get well by leaving the antrum entirely open. One of the first cases I ever saw had an opening into the antrum as large as my largest finger. A gentleman in the country had been treating it. He had packed the antrum full of cotton to the floor of the orbit. It was a great annoyance, both mentally and physically, to the patient. I removed the pieces of cotton. I gave him a pre-

scription, 1 in 64 of carbolic acid, with a syringe, and told him to "wash it out after every meal himself, and otherwise let it alone." He did so, and in a few months' time it healed.

DR. B. HOLLY SMITH: This suggestion of Dr. Fillebrown's in reference to anatomical arrangement recalls to my memory some cases where the temporary conditions following "*la grippe*" have resulted in the cavity being filled with fluid; no opening of any character has been made, and recovery has resulted soon after the original trouble subsided. The leak of the frontal sinus into the antrum could only be explained on Dr. Fillebrown's hypothesis. In reference to the treatment of these suppurating conditions in the antrum, I think that as a class we are too timid. I believe in bold operations. It is a well-known principle in surgery that we must have drainage for these conditions, and if an operator will heroically enter these cavities, cut out the floor, if need be, and open up every part, curette the surface and pack with iodoform gauze, the surface will clear up in a very short time. I have seen these cases treated for six years without relief, while an operation of the character described has afforded relief in a few days. Of course the iodoform gauze should only remain for a very short time.

DR. BARRETT: With reference to my own paper, I have nothing special to say. We all of us recognize the importance of the subject, and I believe it to be an indisputable fact that dentists are about the poorest anatomists, generally, of any class of men who practice the healing art; and I believe it to be, further, an indisputable fact that there is no class of men who should have a more intimate knowledge of the anatomy of the muscles of expression than the dentist.

Concerning Dr. Fillebrown's paper. Last year, Dr. Cryer presented a considerable number of anatomical dissections in which he traced the course of the canal through the infundibulum until it discharged directly into the antrum; indisputably, in some of the cases he exhibited it could not discharge into the meatus of the nose. This was to me something comparatively new. I had suspected something of the kind, but simply a break-down which had allowed the discharge into the antrum. But the infundibulum, even in those cases in which it discharges into the meatus, leads so dangerously near to that separation of the bones, the non-union of which forms the opening into the antrum, that it was plainly evident that in many cases it might discharge directly into it. Dr. Cryer proved it. From that time on to the present, during the last year, my practice has

been in that direction to a large extent, and I have modified it as regards antral troubles, most materially. Since my practice has been so modified, I have found no necessity whatever for the introduction of any tube into the antrum. I believe it to be unpathological, I believe it to be unphysiological, and we are entirely wrong. A tube introduced into the antrum must of necessity be an irritant and cause a breaking down of the tissue, besides not perfectly draining the antrum. If there be a discharging surface or an empyema of the antrum, perfect drainage of that will, in almost all cases, cause a complete cure. I make a large opening into the antrum, and simply leave that and cleanse the cavity thoroughly. If there be granules of the mucous membrane around it, so as to form a kind of operculum, which shall drop down and partially close the opening, I cauterize them, so as to leave them patulous. I had one case in which the patient had suffered a long time. I resorted to the method to which I have just referred, told her to come back in two days; she did not return until the end of four days, and then reported herself as well. I dismissed her for a week, and she did not return for a month, and then I, too, was satisfied that she was cured.

This paper calls our attention to something that we should know, and, if we will study it, I think it will materially modify our practice in all of the antral difficulties, and we shall find there is no necessity for the violent measures which we have adopted in the past, and especially for the packing of the antrum or for the introduction of a drainage-tube.

DR. HEAD: Dr. Barrett has said that no class of practitioners have so little knowledge of anatomy as dentists. I cannot agree with him. While we confess in sorrow our insufficient anatomical learning, there is a class yet beneath us, and that is the general practitioner of medicine.

DR. MORRISON: It has been my good fortune to report to this body from year to year, for a number of years, the planting of teeth, and I merely wish to report progress, and to say that I continue to plant teeth with as much confidence as ever of their rendering good service for a reasonable time.

On the subject of orthodontia I would say that instead of using an apparatus to regulate the whole arch, or several teeth in the arch at one time, I merely direct force upon one, using the hint of the physiological action that nature develops one side at a time, sometimes one a little in advance of the other. They are taken in pairs as a

rule, but sometimes one side of the mouth will be several weeks or months in advance of the other. For instance, in interlocked laterals, where the lower jaw interlocks the superior laterals into a false position, I drive out one of the laterals to where I want it. Then I make a little retaining-band yoke to hold that one in position, reverse the apparatus, and put it on the tooth on the other side, and push that out into position.

DR. FILLEBROWN: What I have to say further on this subject will be in connection with some lantern slides which will be shown this evening.

I think Dr. Barrett must be mistaken. Within a few weeks, by the favor of Dr. Cryer, it has been my privilege to show all of the slides with which he illustrated his paper read before this Association last year, and to re-read his excellent paper in describing them, and among the pictures the points I have shown did not appear, and there was no allusion to it in the text.

DR. BARRETT: May I correct you? I said nothing about any slides whatever. I spoke of some anatomical exhibitions which he made to quite a number of gentlemen who were there. I saw nothing of the slides. He had no slides of them that I know of.

DR. FILLEBROWN. With what Dr. Cryer may have said in private we have nothing to do, and my position is correct. I went with others to Dr. Cryer's room, and he professed to show us all of his specimens from which the slides were produced. He showed us nothing in regard to the points to which I have called attention. Dr. Barrett has well remarked that dentists do not know enough of anatomy. This is an additional reason why dental schools should teach anatomy thoroughly from *caput* to *pedestal*. Dental students are just as capable scholars as are medical students. They only need an equal opportunity. The Harvard dental class has furnished one of the very few students who have reached a rank of 100 in that branch. Several of the dental classes here won from their instructors in anatomy the compliment of being a superior lot of men.

SECTION VII.—Continued.

Nodule on Apex of Root.

PAPER BY H. L. AMBLER, OF THE SECTION.

A LADY aged about thirty presented for treatment of a chronic abscess of the right superior lateral incisor; upon examination with a probe, it was found that the labial wall of bone, at the apex of the root, had been destroyed. With the intention of scraping the apex and breaking up the sac, a small right-angled scoop was introduced; it passed easily over and around the apex. Upon withdrawing it, a small nodule of dentine or enamel about the size of an ordinary pinhead was brought away. The abscess was treated with pyrozone four times at intervals of three days, when the discharge ceased. Evidently the pulp had been dead for a long time, and the canal filled, as there were large mesial and distal fillings. The case was lost sight of for a year, and in the mean time she had this lateral, and also the right central, which was badly carious, extracted, and is now wearing a partial artificial denture.

The special interest attached to the case is the fact of finding a nodule at the *apex* of the *root*, especially of a *single-rooted* tooth.

Enamel-nodules are small excrescences, apparently consisting of enamel, occasionally met with upon the roots of teeth. They are generally found upon multiple-rooted teeth, situated a little below the neck and often at the junction of two roots. On section they are found to consist of a cone of dentine covered with a rather thick layer of enamel, and often connected to the crown with enamel.

Wedl says that these nodules are the result of localized continuations of the development of the enamel between the already developed basal portion of the roots, and are produced by a strip of the enamel-organ which has persisted longer than the rest. Smale shows a cut of one of these nodules on the apex of a *molar* root, and says they may be accounted for by a budding from the tissues concerned in the process of the formation of the tooth. Tomes shows a cut of a nodule situated on the *neck* of a *single-rooted* superior cuspid.

SECTION VII.—Continued.

Artificial Pulps.

LECTURE BY WM. H. RICHARDS, OF THE SECTION.

THE accessibility of the teeth enables one to study their morphology and permits easy classification of all the natural external peculiarities, and serves as an index to the diseases which prevail during their formation. Not so, however, with the pulps, for hitherto all efforts at studying their features have been fruitless by reason of their dense bony covering, the delicate, fern-like formation of some of their fibers, and the ease with which pulp-tissue is destroyed.

We have been content to leave the pulp (King of *Nerves?*) to *live* and die within its pearly palace without a knowledge of the ills which beset it, or of a mode of preserving its corpse in its entirety as a study, even at the expense of its castle.

From time immemorial the knowledge of pulps was gained by first *cracking* the teeth and noting the relation of cavity to pulp, etc.; later investigators sought, by cutting longitudinal and cross sections, to systematize the work by better comparison; latterly teachers have amplified the above by fastening the teeth so cut to blocks of wood with sealing-wax, from which impressions or silhouettes are printed on paper for ready reference and classification.

These modes of procedure furnish ideas of the pulp along lines which have varied so little, and are so far from presenting a clear conception of the outlines of the pulp, that a better mode of presenting the same will be fully appreciated.

The first steps in any new departure are always beset by many annoyances before perfect results are attained. *No* idea, if it contains a suggestion for advancement, however imperfectly conceived, should

be concealed. Therefore, I determined to lay before the profession the line of work I am pursuing *without waiting* until I shall have accomplished *all* that I *see* possible, trusting that by so doing thought will be stimulated in the direction referred to, with the hope that the suggestions may lead to a more comprehensive conception of the physical characteristics of an organ which undergoes many changes from its inception, through its life, to euthanasia with the body, and which is more liable, by its malformation, to be mistreated than any other organ.

The idea of divesting the pulp of its tooth, or of digesting the tooth and leaving the pulp, has, no doubt, been the desire of many ever since a closer knowledge of the exterior of the pulp has been demanded.

Filling the pulp-canals *in* the mouth is of common occurrence. To fill them *out* of the mouth, remove the teeth and leave the material which occupied the cavities representing the pulps as they occupied the teeth, gave the suggestion which led to experimenting, thus enabling me to present to you as exact a reproduction of the pulps of teeth as can be procured. The following method, patiently carried out, will accomplish this:

First remove the animal matter from the pulp-chamber of an extracted tooth in any suitable way—preferably by digesting; occupy the cavity with any substance, under pressure, which will not be affected by acid, alkali, or heat.

Gelatin submitted to formalin forms a horn-like substance which admits of the above treatment; cataphoric influence greatly facilitates the action, but it should be applied after the chamber has been occupied by the gelatin.

I hope, in the near future, to present a much simpler mode that will place the process in the hands of the dental students, that each may vie with the other in the study, which will involve the comparison of the pulps with the teeth from which they were taken; will note the influence of temperament, age, and previous condition of servitude; and, besides, will show variations in the form of the pulp not indicated in the exterior formation of teeth, because said change was brought about subsequent to the exterior formation and superinduced by constitutional disturbance or disease.

We have presumed, because of the well-settled view our present mode of studying has afforded us, that the pulps maintain a form in keeping with the exterior shape of the teeth.

PLATE A.

PLATE B.

PLATE C.

PLATE D.

PLATE E.

PLATE F.

PLATE G.

PLATE H.

PLATE I.

PLATE J.

By reference to Plate A, No. 1, you will observe a formation partaking of the form of polypus,—having a peduncle, or neck, and other characteristic peculiarities akin to polypi. Those adjacent thereto have likewise the ovoid exterior, but with larger neck connection. The exterior form of the tooth from which it was taken did not attract attention by a similar bulging. On same plate, Fig. 2, the lingual root of the pulp is bifurcated at the apex, and on the bucco-mesial root there is a branch. Same plate, Fig. 3, bucco-mesial limb bifurcated.

PLATE K.

1

Plate B contains pulps of two bicuspids and one superior molar complete. Note the projections, or lateral horns, on the molar pulp at the neck.

Plate C—lower molar pulps.

Plate D—lower molar pulps.

Plate E shows relative comparison of crown and root of the superior second bicuspids and the pulps.

Plate F—mesial and distal view of superior cuspids, and comparisons of crown and roots with pulps.

Plate G—two superior first bicuspids. No. 1 shows a lateral projection of tissue.

Plate H—relation of pulp to crown, and apical view of pulp-roots.

Plate I—a view of twenty molar pulps from their apices.

Plate J—No. 1, fusion of right superior cuspid with lateral incisor; No. 2, pulp; No. 3, projection of fleshy matter into the root of a tooth in the region of the canal of a lateral incisor which remained in the jaw when the tooth was extracted.

Plate K contains six superior molar pulps. No. 1 is remarkable for the amount of tissue and the number of branches shown at the apices of the lingual and distal roots.

The difficulties attending the complete removal of all the pulp-tissue from a tooth *out* of the mouth through as small an opening as we would *in* the mouth, would lead one to consider, after viewing what a tooth may contain, how far we may err in attempting to fill pulp-canals perfectly, and how *immediate* root-filling should be regarded.

SECTION II.

DENTAL EDUCATION, LITERATURE, AND NOMENCLATURE.

REPORT BY LOUIS OTTOFY, CHAIRMAN OF THE SECTION.

MR. PRESIDENT AND GENTLEMEN: The Section on Dental Education, Literature, and Nomenclature begs leave to offer the following as its annual report:

I. Education.

Since 1887 this Section has regularly reported the number of dental colleges in active operation in the United States, with such additional information as has been deemed proper. The rule followed simply aimed at a truthful report of the number of colleges, newly organized institutions, and such other incorporated bodies as confer the dental degree. No attempt to discriminate has been made. Inasmuch as the list thus published by this Association each year is being accepted, and offered as evidence of the existence of dental institutions, it seems manifestly improper that institutions reputed to exist, but regarding which no information can be obtained, should be placed side by side with institutions which are established and known to be engaged in the work of dental education.

The innovation, therefore, begins this year of separating the dental

schools of this country, according to the information in possession of this Section regarding them, into three classes :

1. Dental colleges in active operation.
2. Dental colleges organized during the past year.
3. Corporations conferring the dental degree, but regarding which no further information is at hand.

The following is the number of "Matriculants," "Students in Attendance," and "Graduates," as reported by each school for the session of 1895–6 :

	Matriculants.	Attendance.	Graduates.
ALABAMA :			
*Birmingham Dental College, Birmingham...	36	36	6
CALIFORNIA :			
*University of California, College of Dentistry, San Francisco.....	195	195	52
COLORADO :			
*University of Denver, Dental Department, Denver.....	31	28	8
DISTRICT OF COLUMBIA :			
*Columbian University, Dental Department, Washington.....	63	56	14
*Howard University, Dental Department, Washington.....	13	12	3
*National University, Dental Department, Washington.....	47	47	6
GEORGIA :			
*Atlanta Dental College, Atlanta.....	202	200	40
*Department of Dentistry, Southern Medical College, Atlanta.....	52	49	5
ILLINOIS :			
*Chicago College of Dental Surgery, Chicago.	436	399	107
¶Columbian Dental College, Chicago.....	63	63	25
*Northwestern College of Dental Surgery, Chicago.....	12	10	3
*Northwestern University Dental School, Chicago, and American College of Dental Surgery, *consolidated*.....	543	543	149
INDIANA :			
*Indiana Dental College, Indianapolis.....	157	157	43
IOWA :			
*Dental Department, State University of Iowa, Iowa City.....	212	212	33

	Matriculants.	Attendance.	Graduates.
KENTUCKY:			
*Louisville College of Dentistry, Louisville..	141	141	33
MARYLAND:			
*Baltimore College of Dental Surgery, Baltimore	207	207	44
†Baltimore Medical College, Dental Department, Baltimore	34	30	3
*University of Maryland, Dental Department, Baltimore	204	202	42
MASSACHUSETTS:			
*Boston Dental College, Boston	189	189	37
*Dental Department of Harvard University, Boston	104	103	22
MICHIGAN:			
*Detroit College of Medicine, Department of Dental Surgery, Detroit	70	70	19
*University of Michigan, College of Dental Surgery, Ann Arbor	190	189	60
MINNESOTA:			
*University of Minnesota, College of Dental Surgery, Minneapolis	90	84	14
MISSOURI:			
*Dental Department, Marion Sims College of Medicine, St. Louis	44	38	6
*Kansas City Dental College, Kansas City	149	135	47
*Missouri Dental College, St. Louis	101	96	29
*Western Dental College, Kansas City	220	202	46
NEBRASKA:			
†Dental Department, University of Omaha, Omaha	33	31	3
NEW YORK:			
*New York College of Dentistry, New York.	339	309	74
‡New York Dental School, New York.		16	3
*Dental Department, University of Buffalo, Buffalo	187	187	36
OHIO:			
*Cincinnati College of Dental Surgery, Cincinnati	33	33	8
*Cleveland University of Medicine and Surgery, Dental Department, Cleveland	23	23	6
*Ohio College of Dental Surgery, Cincinnati	213	210	47
†Ohio Medical University, Department of Dentistry, Columbus	62	62	13

	Matriculants.	Attendance.	Graduates.
OHIO (*Continued*)—			
*Western Reserve University, College of Dentistry, Cleveland	53[b]	53	7
PENNSYLVANIA:			
*Pennsylvania College of Dental Surgery, Philadelphia	343	319	96
*Philadelphia Dental College, Philadelphia	409	400	116
*University of Pennsylvania, Department of Dentistry, Philadelphia	325[c]	310	74
TENNESSEE:			
*Central Tennessee College, Meharry Dental Department, Nashville	18	18	3
*Tennessee Medical College, Department of Dentistry, Knoxville	18	18	2
*University of Tennessee, Dental Department, Nashville	54	50	11
*Vanderbilt University, Department of Dentistry, Nashville	154[d]	150	29
VIRGINIA:			
*University College of Medicine, Department of Dentistry, Richmond	36	36	13
WASHINGTON:			
‡Tacoma College of Dental Surgery, Tacoma.	26	25	3
WISCONSIN:			
†Milwaukee Medical College and School of Dentistry, Milwaukee	65	60	6
TOTAL	6212	6003	1446

* Members of the National Association of Dental Faculties.
¶ Announces that it will conform to the rules of the National Association of Dental Faculties.
† Application for membership in National Association of Dental Faculties favorably reported upon.
‡ Gave notice that it will present its application for membership in the National Association of Dental Faculties in 1897.
a Including one special student.
b Including one post-graduate.
c Including seven special students.
d Including three special students.

New schools organized during the year. (No sessions held as yet.)

COLORADO:

¶Colorado School of Dental Surgery, Denver.

PENNSYLVANIA:

¶Pittsburg Dental College, Department Western University of Pennsylvania, Pittsburg.

Corporations conferring the dental degree (no other information at hand).

ILLINOIS:

German-American Dental College, Chicago.

MISSOURI:

Kansas City College of Dental Surgery, Kansas City.

WISCONSIN:

Wisconsin College of Dentistry, Milwaukee.

	TOTAL.
1. Dental colleges in active operation	46
2. Organized during the past year	2
3. Corporations conferring the dental degree	3
	51

According to these statistics there were matriculated as students of dentistry during the past year 6212 persons; 6003 of whom were in actual attendance, and upon 1446 of whom the dental degree was conferred.

The following table indicates the increase in the number of graduates since 1886:

	FOR THE YEAR.	GRAND TOTAL.
1886	503	
1887	597	1100
1888	746	1846
1889	796	2642
1890	963	3605
1891	1241	4846
1892	1483	6326
1893	379*	6708
1894	905*	7613
1895	1208	8821
1896	1446	10,267

It is deserving of mention that every college now actively engaged in teaching, or which has been organized during the year, is either a member of the National Association of Dental Faculties, has an application for membership pending, or has announced its intention to conform to the rules or apply for membership in the National Association of Dental Faculties.

In the latter class there are but five colleges in the country, and these intend to apply for membership as soon as they have complied with certain necessary requirements.

This information might not be considered of much consequence were it not for the fact that the National Association of Dental Fac-

* The decrease in 1893 and 1894 was due to the operation of the three-year course.

ulties has at its session this week taken one of the most important steps in the history of dental education, by the adoption of a plan of preliminary examination for the admission of students to colleges.

Hitherto an applicant presented himself for admission, and it was left wholly to the judgment of some official of the college to accept or reject. There is no doubt that this imperfect system resulted in the admission of many who were not properly qualified. By the plan just adopted, the requirements for admission into all of the colleges are identical, and are graded from year to year in such a manner that, beginning with next year, the educational standing of our students will be higher and increase within four years to a plane practically equivalent to a high school education. The Section deems this action one of the most important advances made in dental education.

The Section has no further report to make on Dental Education or Literature, desiring these subjects passed without discussion, in view of the amount of time devoted to them last year.

The report on Dental Nomenclature will be made by Dr. Guilford, Chairman of the Special Committee.

SECTION II.—Continued.

Report of Committee on Dental Nomenclature.

By S. H. GUILFORD, Chairman of the Committee.

YOUR Committee would report that it has endeavored to carry forward its appointed work during the past year to the best of its ability.

The tabular portion of last year's report, which could not then be read on account of its length, has since been carefully revised and arranged and appears in the published Transactions.

Notwithstanding the great amount of time spent upon it, it is not entirely free from errors and inaccuracies. Some of these have been called to the attention of the Committee, and others, it is hoped, will be.

While the report was in type for the Transactions several hundred reprints were made, and these were sent to various dental societies and individuals in different sections of the country, with the request that the subject of the report be brought before the different organizations for discussion and criticism. The Committee knows that this was done in several instances, but the results have been forwarded or published in but one, namely, the Academy of Stomatology of Philadelphia. Its consideration of the subject is printed in full in the August number of the *International Dental Journal*, and parts of it have been incorporated in the present report.

Your Committee had some difficulty in deciding upon the system of phonetic spelling to be used in indicating the sounds of vowels and syllables, but finally decided to adopt that used in the Century Dictionary as being more exact and simpler than any other.

Your Committee has also thought best to append a list of terms the use of which should be discontinued, such as canine, wisdom-tooth, sixth-year molar, air-chamber, odontitis, aluminium, cast, and others.

Following is an abstract of the discussion by the Academy of Stomatology, Philadelphia:

DR. GUILFORD: I desire to comment briefly upon a few of the features of the report, as it exhibits findings which are at variance with our common views, particularly as it relates to the pronunciation of words.

You will notice, first, that the word abnormity is given preference over abnormality; it is shorter.

The distinction between absorption and resorption is sharply drawn. These words are frequently employed as synonyms, but they are not synonyms. The accent in the word alloy is placed upon the last syllable. Aluminum replaces aluminium. In the word anesthetic the diphthong *æ* has substituted for it the vowel *e*.

You will notice the plural of apex, which has its accent upon the *a*, is apices, the first syllable being *ap*,—ap'icēs.

Proximate and proximal are preferred to approximate and approximal; the words are then stems upon which any prefixes or suffixes may be grafted.

The meeting of the masticating surfaces of the upper and lower teeth is frequently spoken of as an articulation; it is more accurately described by the word occlusion.

In the word bifurcated the accent is placed upon the second, not the first, syllable.

The words calcareous and calcific are frequently used interchangeably; this is an error. A calcareous substance is one formed of or containing lime; a calcific body is one which forms lime.

A great deal of confusion surrounds the two terms cast and model. An arbitrary distinction has been suggested, so far as dentistry is concerned, by making model to serve as the term for a plaster cast which is to be reproduced in metal; cast to be applied to the plaster not so reproduced. The practice of calling all plaster casts models appears to be more acceptable.

Of the two pronunciations of cement, cement' is preferred to cem'ent.

Contour is pronounced contour', not con'tour.

Cor'onal is correct, coro'nal incorrect.

The majority of dictionaries give the preference to dentin over dentine.

In fora'men the accent is upon the *a'*, not upon *am'*.

The spelling, gage, has generally displaced gauge.

In the word gingivæ the accent is upon the second syllable, and the "i" in this syllable is long. It is jin-ji'væ, not gin'-givæ.

The singular of matrix is ma'trix, the plural mat'rices.

Pericementum should be the term employed instead of periosteum.

Sixth- and twelfth-year molars are solecisms.

The word solder is omitted from the list; it is to be pronounced sod-der, not sol-der.

The words vulcanite and rubber, often used as synonyms, should be distinguished. Rubber, a soft body of certain composition; vulcanite, a hard body of a different chemical composition.

The word obturator is restricted to appliances which cover an opening in the hard palate.

A velum is an appliance designed to remedy a deficiency of the soft palate.

The terms sweating and autogenous soldering appear to be unsatisfactory

DR. BURCHARD called attention to the following points:

You will notice in the list that the word abnormality is defined as the state or quality of being abnormal; irregularity, deformity, malformation. The word is given as a noun, and you will see that the definition implies, in part, an adjective. Instead of the definition given, it is suggested that one founded upon the etymology of the word would be more precise and ex-

planatory: *An abnormality is an abnormal thing, not state.* "*It is a variation from a general typal form.*"

It is given as a definition of alloys that they are compounds of metals produced by fusion. This is inexact: *they are compounds formed when the metals are in a state of fusion.* In the verb definition of the same word, to alloy, to reduce the purity of or otherwise modify metals by admixtures, the words *with other metals* should be appended. For the purity of a metal may be reduced without forming an alloy; for instance, the purity of silver is reduced by admixture with sulfur, oxygen, chlorin, bromin, and so on, and yet such compounds, it is needless to state, are not alloys.

The words analgesia and analgesics are omitted. I think a distinction should be drawn between anesthesia and analgesia. As a rule, we find these words used as synonyms. Anesthesia is a word which was coined by Dr. Oliver Wendell Holmes to designate the state of insensibility produced through the inhalation of ether or chloroform. It refers to a general abolition of sensation. Analgesia denotes explicitly an absence of pain; analgesics would therefore include anodynes and obtundents. The root *æsthesis* refers to psychical perceptions,—that is, sensation in the sense that the mind perceives,—therefore the title anæsthetics should be applied to agents which produce general unconsciousness; analgesics to those which destroy sensation, and do not affect general consciousness.

For the word anomalous we find the definition: "Deviating from that which is natural." This defines an abnormality, not an anomaly. A definition to be in consonance with the etymology of the word should state, "Deviating widely from that which is natural." The same adverb should be inserted in the definition of anomaly.

The definition of asepsis is unsatisfactory and not precise. It states, "Absence of blood-poisoning, exemption from putrefaction and its consequences." The word sepsis should be substituted for putrefaction. These words are not mutually synonymous. Putrefaction always implies sepsis, but sepsis may or may not be due to putrefaction. A comprehensive definition would be, "Asepsis is an absence of those substances the absorption of which causes the condition of septicemia."

In the definition of antiseptics, septic should be substituted for putrefactive.

In the definition of atavism, the word recurrence is used instead of the usual one, reversion, and it is perhaps better, as it is more precise.

In the definition of the word atrophy, it says, "A gradual wasting of the body." It would be more embracive to say, "A wasting of *a tissue, an organ, or the body,*" for atrophy of a single part is very common.

For the definition of asphyxia, the following is submitted, in lieu of that given in the pamphlet: "Asphyxia is a suspension of vital phenomena due to a cessation of normal respiration."

In the definition of calcareous, it is given, "Composed of or containing lime." Calcium salts should be substituted for lime. When we say lime we mean the oxid of calcium; calcareous may or may not refer to the oxid; in fact, it rarely does when used in connection with physiology or pathology.

In defining epithelium it is spoken of as a "very delicate membrane." This is misleading, for, in point of fact, epithelium represents resistance. Modified epithelial tissue is the most resistant of all tissues. The "very delicate" should be omitted. The following definition is suggested: "Epithelium,—the external cells covering the surface of the body, lining mucous passages and glands."

The word odontitis is an impossibility; we cannot have inflammation of all parts of a tooth.

Odontoblasts are defined as "the cells which are active in the formation of dentine." Many other cells are also active. The odontoblasts are the cells through which the dentine is formed.

Odontoma is spoken of as "a tumor composed of dentine." Although

it does contain dentine, it may also, and usually does, contain other dental tissues, enamel and cementum.

The word spelt ferrule is advised to be pronounced feril. This seemed so incongruous that I looked up the etymology of the word. It is traced first to its French source, *virole*, meaning an iron ring. This is in turn from the middle Latin of *viriola*, a little circlet; it is a derivative of *ferrum*, iron, which is also the etymological source of ferrel. You will notice that the *oo* or the *l* sound is present, but not any sound from which feril could be derived; so that, according to etymology, the pronunciation should be ferrool or fer-rel.

In works and discussions upon dentistry, the terms prosthetic and mechanical dentistry are used as synonymous. It appears to me that a distinction should be drawn between them.

Prosthetic dentistry includes the planning, devising, and construction of apparatus designed for the replacement of lost dental parts. Mechanical dentistry includes the technical operations through which these appliances are constructed. Prosthetic dentistry, the architect's side; mechanical dentistry relates solely with laboratory technology. Mechanical dentistry is included in the prosthetic, and is but part of it.

At the present time, when so much attention is being directed to what is generally known as "dental technics," your Committee would recommend the abandonment of this double, hybrid term and substitute for it a single word derived from pure Greek roots, "Odontotechny," as noted in the list of words printed during the past year, although the definition attached to it there is very faulty. Pyrotechny is a good word, and generally used in the arts. Why then should we not use as pure and good a word to describe the purely mechanical part of our work?

When your Committee's work was first undertaken, it was with the simple view of improving our nomenclature for our own benefit, but its sphere has widened somewhat since, and the good results of the labor expended are shown in the fact that some medical lexicographers, having heard of our work, have shown a commendable desire to secure copies of our first report, with a view to including our list of terms and definitions in their respective dictionaries.

If those who can will help us by suggestions and generous criticism, we are sure that our work will bear the best of fruit.

Respectfully submitted,

S. H. GUILFORD, *Chairman*,
LOUIS OTTOFY,
GRANT MOLYNEAUX,
THOS. E. WEEKS,
E. C. KIRK,
A. H. THOMPSON,
C. L. GODDARD,

Committee.

Word.	Pronunciation.	Committee's Decision.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Abscessed	ab′-sest		p.a.	×	o	o	o	×	Diseased with an abscess; as an *abscessed* tooth.
Adhesion	ad-hē′-zhun		n	×	×	×	×	×	A physical force by virtue of which one body or substance remains attached to the surface of another with which it is brought into contact.
Remarks.—Full upper artificial dentures, when without a vacuum-chamber, are said to be held in place by the force of adhesion.									
Analgesia	an-al-ge′-sia		n	×	×	×	×	×	Insensibility to pain.
Analgetic	an-al-get′-ic		a	×	o	o	o	×	Anything that produces analgesia.—*Standard.*
Antimony	an′-tĭ-mō-nĭ		n	×	×	o	×	×	A metal of a white color and bright luster which does not readily tarnish, having a specific gravity of 6.7; at. wt. 120. Melts just below a red heat, about 840° F.
Antisepsis	an-tĭ-sep′-sis		n	×	×	×		×	The prevention or cure of disease-processes by the removal or destruction of pathogenic organisms and their waste products.
Antiseptic	an-tĭ-sep′-tic		a-n	×	×	×	×	×	*a.*, Inimical to the growth and activity of the micro-organisms of disease. *n.*, Anything which destroys or restricts the growth and multiplication of disease-germs.
Articulator	ar-tik′-ū-lā-tor		n	×	o	×	o	×	An apparatus for obtaining the correct occlusion of sets of artificial teeth.
Artificial Crown	ar-ti-fish′-al kroun		n	o	o	×	o	o	A crown of either porcelain or metal or both; to be adjusted upon the root of a natural tooth.
Artificial Teeth	ar-ti-fish′-al teeth		n	×	×	o	o	×	A dentist's imitation of natural teeth. (Spec.) Porcelain teeth, composed of silica, kaolin, feldspar, and coloring matters.—*Com.*
Artificial Velum	ar-ti-fish′-al vē′-lum	×	n	o	o	o	o	o	An appliance composed of flexible vulcanite, used in the mechanical treatment of fissure of the soft palate.
Asbestos	as-bes′-tus		n	×	o	×	×	×	A fibrous silicate of calcium and magnesium; infusible and incombustible.—*Attfield.*
Asepsis	a-sep′-sis		n	×	×	×	o	×	Absence of living germs of disease.
Aseptic	a-sep′-tik		a	×	×	×	o	×	Free from the living germs of disease, fermentation, or putrefaction.—*Century.*
Asepticize	a-sep′-ti-sīz		v	×	o	×	o	×	To render free from living disease-germs.
Babbitt-Metal	bab′-it-met′-l		n	×	o	×	o	×	A soft, white, anti-friction metal composed of tin, copper, and antimony.
Remarks.—Dental formula, Haskell: tin 8 parts, copper 1 part, antimony 2 parts.									

×, Given by author; o, Not given by author; a, Adjective; n, Noun; v. Verb; ×, in "Committee's Decision," means the Committee's choice; 1, Preferable; 2, Allowable.

Band	bănd		n	×	×	×	o	×	A thin strip of any material, usually flat and flexible, used for binding. (Spec.) A thin metal hoop used to encircle the natural teeth or roots.—*Com.* In embryology, the involution of the epithelium of the jaw from which the enamel-organs are formed.
Base-metal	bās-met-l		n	×	o	×	o	×	A metal such as tin, zinc, copper, antimony, etc., which easily unites with oxygen when exposed to the air or a low heat.
Base-plate	bās-plāt		n	×	o	×	o	×	"The foundation plate, the support of anything." (Spec.) That part of an artificial denture which supports the artificial teeth and to which they are attached. *Com.*
Bellows	bel′-ōz		n	×	o	×	o	×	An instrument or machine for producing a current of air, principally used for blowing fire, etc., and intensifying the heat by supplying oxygen under pressure.
Bismuth	biz′-mŭth		n	×	×	×	×	×	A metal of a peculiar light reddish color, highly crystalline and so brittle that it can be pulverized. At. wt. 20.8; specific gravity 9.6 to 9.8. Fuses at 264° C.
Blow-pipe	blō′-pīp		n	×	×	×	×	×	An instrument by which a current of air or gas is driven through the flame of a candle or gas jet to direct the flame upon some substance in order to fuse it, an intense heat being created by the force or supply of oxygen and the concentration of the flame on a small area.
Bridge-work	brĭj′-wurk	×	n	o	o	×	o	o	A method of dental substitution that does away with the customary base-plate, the artificial teeth spanning the edentulous space with attachments to natural teeth at one or both ends of the span.—*Com.*
Britannia-metal	bri-tan′-i-ă-met′l		n	×	o	o	o	×	An alloy made with tin and varying proportions of copper, antimony, bismuth, and zinc.
Bunodont	bü-no-dŏnt		a	×	o	o	o	×	Having a tooth-crown supporting rounded tubercles.—*Cope.*
Cadmium	kad′-mĭ-um		n	×	×	×	×	×	A metal resembling tin in color and general appearance, having a "cry" when bent. Its hardness is between that of gold and tin, and it can be rolled into sheets or very thin foil. Specific gravity of the cast metal 8.25; when rolled 8.69. At. wt. 112.1 (F.) 260° C.
Caoutchouc	kŏ′-tchōōk		n	×	×	×	×	×	Indian name for India rubber. A hydrocarbon insoluble in water and alcohol. When combined with sulfur and subjected to heat for a definite time it is converted into hard rubber or vulcanite. ($C_{16}H_7$.)
Cap Crown	kap′ kroun	×	n	o	o	o	o	o	Same as Shell Crown.
Carat	kar′-at		n	×	o	o	o	×	"The 24th part;" "formerly the 24th part of a gold marc," used to express the proportion of gold in an alloy. "The unit of weight of precious stones." About 4 grs.?
Carborundum	kar-bo-run′-dum		n	o	o	o	o	o	Carbide of silicon, SiC. A compound of carbon and silicon made by passing the electric current through a mechanical mixture of sand, coke, and salt. It is harder than corundum and less hard than the diamond. Of great value in the arts as an abrasive. It is formed into wheels, etc., like corundum.
Celluloid	sel′-ū-loid		n	×	×	×	×	×	An elastic compound made by subjecting gun cotton (pyroxylin) mixed with camphor and other substances to hydraulic pressure. An imitative substitute for ivory.
Remarks.—Formerly used as a base for artificial teeth.									

Word.	Pronunciation.	Committee's Decision.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Clasp	klăsp	✓	n	✓	o	✓	o	✓	"A catch or hook used to hold together two things or two parts of the same thing." (Spec.) A piece of spring metal, usually platinous gold, adjusted to three sides of a tooth with one or both ends free, and designed to support partial dentures or other apparatus to be worn in the mouth.—*Com.*
Cohesion	kō-hē′-zhŭn		n	✗	✓	✗	✓	✓	The force by which molecules of the same kind, or of the same body, are held together.
Cohesive	kō-he′-sĭv		a	·	o	o	o	✓	Having the property of cohesion. Possessing a tendency to unite and to resist separation. (Freshly annealed pure gold foil is *cohesive*.)
Collar Crown	kol′-ar kroun		n	o	o	✓	o	o	An artificial tooth-crown mounted upon and attached to a base composed of a metal ferrule and cap, and designed to cover and rest upon a natural root.
Cone-shape	kōne		a	✓	o	o	✗	·	Applied to teeth formed of one cone only, as the cuspids.
Corundum	kō-rŭn′-dŭm		n	·			✓	·	Native crystalline alumina. A mineral next to the diamond in hardness. When pulverized it is used for grinding, polishing, etc. Corundum wheels are made by uniting the powder with a cementing substance and pressing in a mold.
Counter-die	koun′-ter-dī		n	✗	o	o	o	✗	The reverse image of a die. Usually formed from a metal or alloy softer than the die. The metal plate is swaged between the two.
Copper	kŏp′-per		n	✓	✓	✓	·	✓	A metal distinguished from all others by its peculiar red color; at. wt. 63.3. Specific gravity nearly 9 times that of water. 8.838 (native copper). Its melting-point is a little below that of gold.
Cross-pin Teeth	kross′-pin teeth	✗	n	o	o	o	o	o	Artificial teeth in which the pins are arranged parallel with the transverse diameter of the tooth.
Crucible	krō′-sĭ-bl		n	✓	o	✓	✓	✓	A pot or vessel made of some substance that will stand extreme heat, as clay, sand, graphite, and platinum, and used for fusing metals or minerals.
Denterocone	den′-ter-o-kone		n	o	o	o	o	o	The antero-internal cone of the upper premolar.—*Scott.*
Denteroconid	den-ter-ō-kŏn′-id		n	o	o	o	o	o	The antero-internal cone of the lower premolar.—*Scott.*
Die	dī		n	✗	o	o	o	✓	One of a pair of metal formers between which a metal blank is forged into shape. (Spec.) A fac-simile of the form of the mouth in metal from which a metal blank is stamped to fit the mouth.—*Com.*
Die-Plate	dī-plāt	✗	n	o	o	o	o	o	A metal stamp or die used for forming the cusps on shell or cap crowns.
Distal Surface	dis′-tal		a	✗	✓	✓	o	✓	That proximal surface of the crown away from the median line.—*Black.*

Distally	dis'-tal-lĭ		adv	×	o	o	o	×	Toward the distal side of the tooth.—*Black.*
Dowel	dow'-ĕl	×	n	×	o	×	o	×	A pin or peg, usually cylindrical, for joining together two adjacent pieces. (Spec.) A pin or peg (usually of metal) used for joining an artificial crown to the root of a natural tooth.—*Com.*
Draw-plate	draw'-plāt		n	×	o	o	o	×	A perforated steel plate with holes of gradually diminishing size, used to reduce the size of wire and metal tubing.
Ductility	dŭk-tĭl'-ĭ-tĭ		n	×	o	o	×	×	The property of certain solids, such as metal wire, by which they can be extended by drawing out without fracture or separating the parts.
Feldspar	feld'-spär		n	×	×	o	×	×	Any one of a group of minerals having in common a prismatic angle of 120° and consisting of aluminum silicate with potassium, sodium, and barium.
Ferrule	fer'-il		n	×	o	×	o	×	A metal ring or cap used to strengthen the handles of tools, canes, etc. (Spec.) A metal ring or cap applied to the end of the root or crown of a natural tooth to strengthen it.—*Com.*
Flexible Vulcanite *Remarks.*—Often called "Velum" Rubber.	flek'-sĭbl vul'-kan-īt	✓	n	×	o	o	o	×	Vulcanite which is soft and extremely pliable after vulcanization, containing less sulfur and being vulcanized at a lower temperature than hard vulcanite.—*Com.*
Flow	flō		n	o	o	o	o	o	The change in shape which takes place in alloys and amalgams under pressure.—*Black.*
Flux	flŭks		n	×	o	×	×	×	A material, such as borax or alkali, that will dissolve metallic oxids and promote the fusion of metals.
Forging	fōr'-jing		n	×	o	o	o	×	A piece of forged work in metal; a general name for pieces of hammered iron or steel.
Fusible Alloy	fū'-zi-bl al -oi		n	×	o	o	o	×	Any alloy, but usually one containing bismuth and melting at a very low temperature.
Fusion	few'-zhun		n	×	×	×	×	×	The transition of a solid body into a liquid by the action of heat.
Gold	gōld		n	×	×	×	×	×	A precious metal remarkable on account of its unique and beautiful yellow color, luster, high specific gravity, and freedom from liability to rust or tarnish when exposed to air. Specific gravity of pure gold 19.3. Stands first among metals in point of ductility and malleability: at. wt. 196.7. Fuses at 2012° F. 1100 C°.
Gum-teeth	gŭm-teeth	✓	n	o	o	o	o	o	Artificial teeth with a porcelain gum extension above the crown, imitating the natural gum in color.
Hard-solder	hard-sŏd'-ĕr		n	×	o	o	o	×	Any solder that melts above a red heat, such as gold or silver alloys.
Hessian Crucible	hesh-un krū'-sĭ-bl		n	×	o	×	o	×	A coarse, highly infusible sand crucible used in melting gold, silver, and other metals.
Heterodont	hĕt'-ĕr-ō-dŏnt		a	×	o	o	o	×	A term applied to teeth of heterogeneous or unlike forms in the same jaw.—*Owen.*
Homodont	hō'-mō-dŏnt		a	×	o	o	o	×	A term applied to teeth of homologous and similar form throughout the same jaw.—*Owen.*
Hypocone	hī'-pō-kōne		n	o	o	o	o	×	The postero-lingual or internal cone of the upper molars.—*Osborn.*
Hypoconulid	hī-pō-kŏn'-ū-lid		n	o	o	o	o	o	The distal cusp, the fifth or medial tubercle, of the lower molar.—*Osborn*

Word.	Pronunciation.	Committee's Decision.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Impression	im-prĕsh′-ŭn	×	n	×	×	×	×	×	"An imprint, a mark made by pressure." (Spec.) An imprint of the edentulous ridges and palate or teeth in some suitable material, such as beeswax, modeling compound, or plaster of Paris.—*Com.*
Impression Cup	im-prĕsh′-ŭn kŭp		n	×	o	×	o	×	A dentist's cup or tray, used for holding the impression-material while taking an impression of the mouth or teeth.
Incisal Surface	in-sī′-săl		a	o	o	o	o	o	The occlusal surface or cutting-edge of the incisor teeth.—*Black.*
Ingot	in′-gŏt		n	×	o		o	×	A mass of molten metal cast in a mold.
Ingot-Mold	in′-gŏt-mōld		n	×	o	×	o	×	\ flask in which molten metal is cast into blocks or ingots.
Iridium	ī-rĭd′-ĭ-ŭm		n	×	o	×	×	×	\ metal of silver-white color belonging to the platinum family and, so far as known, always present in native platinum. At. wt. 193. Specific gravity 22.38. Fused with great difficulty and only in the oxyhydrogen flame.
"Jimber-jaw" *Remarks.*—Folk-word	jĭm′-ber-jaw		n	×	o	o	o	×	A projecting lower jaw.—*Standard.* (Colloquial.)
Kaolin	kā′-ō-lĭn		n	×	×	×	×	×	An aluminum silicate, $K_4Al_2Si_2O_9$. A decomposed feldspar or porcelain clay.
Lamination	lăm-ĭ-nā′-shun		n	×	×		×	×	Arrangement in layers or thin plates
Lead	lĕd		n	×	×	×	×	×	One of the class of white metals, having a decided bluish-gray tint, remarkable for its softness and durability. At. wt 206.9. Specific gravity about 11.4; fuses at about 617° F., 325° C.
Long-bite Teeth	long-bīt teeth	×	n	o	o	o	o	o	Artificial teeth with the pins considerably removed from the incisal surface, permitting a considerable overlap of the opposing teeth.—*Com.*
Magill-Band	ma-gil′-bănd	×	n	o	o	o	o	o	A platinum or metal band adjusted and cemented to a natural tooth for the purpose of regulating it.—*Com.*
Mastax	mas′-tax		n	×	×	o	o	×	The muscular pharynx of a rotifer, containing the jaw parts.—*Standard.*
Median line	mē′dĭŭn		a	×	o	×	×	×	*a*, The perpendicular line dividing the face into halves. *b*, The middle line dividing a tooth.—*Black.*
Mesial Surface	mē′-sĭ-al		a	×	×	×	×	×	That surface of a tooth toward the median line.—*Black.*
Mesially	mēs′-ĭ-ăl-lĭ		adv	×	o	×	o	×	Toward the median line.—*Black.*
Metal	mĕt′-l		n	×	×	×	×	×	An elementary substance which in the present state of science is undecomposable and which possesses opacity and a peculiar luster commonly called metallic.
Modeling Compound	mŏd′-ĕl-ing kŏm-pound		n	o	o	o	o	o	An impression-material composed of gum damar, stearine, French chalk, and coloring-matter.—*Gorgas.*
Moldine	mōl′-dēn		n	o	o	o	o	o	A compound of potter's clay and glycerin, used for taking impressions.—*Gorgas.*
Multitubercular	mŭl-tĭ-tū-bĕr′-cū-lăr		a	o	o	o	o	o	Designating tooth-crowns having many tubercles or cusps.—*Cope.*

Noble-metal	nō-bl-mĕt-l		n	×	o	o	×	×	A metal, such as gold, silver, and platinum, which does not easily unite with oxygen when exposed to the air or a red heat.
Oxidizing-flame	ok′-sĭ-dīz-ĭng-flām		n	×	o	o	o	×	The outer extremity of a blow-pipe flame capable of burning or oxidizing metals.
Placoid	plăs′-oid		n-a	×	o	o	o	×	Plate-like, as the scales of sharks, or some kinds of teeth of sharks and rays.—*Standard.*
Plain-teeth	plān-teeth	×	n	o	o	o	o	o	Artificial teeth without a porcelain gum extension.
Plaster of Paris	plăs′-ter-of-par′is		n	×	×	×	×		Pulverized native gypsum from which some of the water has been driven off by heat. Used in making impressions, casts, models, etc.
Plate-teeth	plāt-teeth		n	o	o	o	o	o	Artificial teeth with headless pins, permitting a metal backing or stay to be placed over them and by which, when the backing has been soldered to the plate, the teeth are held in place.
Plating	plā′-tĭng		n	×	o	o	o	×	The art of covering articles with a thin coating or film of metal.
Platinize	plăt′-ĭ-nīz		v	×	o	o	o	×	To coat with platinum in a fine state of division, preferably by electrolysis.
Platinized Gold *Remarks.*—Erroneously used for platinous gold or "clasp metal."	plăt′-ĭ-nīz′d-gōld	×	n	o	o	o	o	o	Gold plate covered on one or both sides with a layer of platinum.—*Com.*
Platinous	plăt′-i nŭs		a	×	o	×	o	×	Containing or consisting of platinum.
Platinous Alloy	plăt′-ĭ-nŭs al-loi	×	n	o	o	o	o	o	An alloy containing platinum.—*Com.*
Platinous Gold	plăt′-ĭ-nŭs gōld	×	n	o	o	o	o	o	Gold containing a small percentage of platinum, often called "clasp-metal."—*Com.*
Platinous Silver *Remarks.*—Erroneously called "white metal," known in England as "Dental Alloy."	plăt′-ĭ-nŭs sĭlver	×	n	o	o	o	o	o	Silver containing a small percentage of platinum.
Platinum	plăt′-ĭ-nŭm		n	×	×	×	×	×	A noble metal, white in color, surpassed in ductility only by gold and silver and in malleability only by those metals and copper. Easily rolled into sheets and drawn into wire. At. wt. 194.9. Specific gravity 21.5. Fusible only in the oxyhydrogen flame.
Porcelain	pōrs′-lān		n	×	o	×	×	×	A translucent compound, the result of fusing kaolin, feldspar, and finely-divided silica together.—*Altfield.*
Quartation-process	kwâr-tā′-shŭn		n	×	o	o	o	×	The method of adding silver to a button of gold alloy in the proportion of 3 parts silver to 1 of gold for refining by the "wet" or acid method.
Quartz	kwârts		n		o	×	×	×	The common form of native silica or the oxid of silicon.
Reducing-flame	rē-dūs′-ĭng-flām		n		o	o	o	×	The inner portion of a blow-pipe flame that will reduce metallic oxids or metallic salts to a metal button.
Refine	rē-fīn′		v		o	×	×	×	To bring or reduce to a pure state; to free from impurities.
Relief	rē-lēf′		n	×				×	(Spec.) A space created upon the palatal portion of an artificial denture to keep it from resting unduly upon the hard portions of the palate.—*Com.*
Rodent Incisor	rō′-dĕnt		a	×	×	×	×	×	The cutting incisor of the mammalian order *Rodentiæ.*—*Owen.*
Rubber	rŭb′-ĕr		n	×	×	×	o	×	Caoutchouc or India rubber.

Word.	Pronunciation.	Committee's Decision.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Sepsis	sĕp′-sĭs		n	✓	✓	×	o	o	The presence and development in the living body of micro-organisms which produce poisonous waste products.
Septic	sĕp′-tĭk		a	✓	✓	✓	×	·	Pertaining to sepsis in general, as *septic* diseases; opposed to ***antiseptic***.
Septicemia	sĕp-tĭ-sē′-mĭ-ä		n	·					A morbid condition of the blood due to the absorption of the poisonous products of bacterial decomposition; septic infection.—*Standard*.
Remarks.—Dunglison, Thomas, and Standard give *septemia* instead.									
Shell Crown	shĕl kroun	✓	n	o	o	o	o	o	A shell of gold or other metal having an outward conformation to the crown of a natural tooth, and made to slip over a badly-decayed tooth to strengthen and protect it.—*Com*.
Short-bite Teeth	shōrt′-bīt-teeth	·	n	o	o	o	o	o	Porcelain teeth with the pins arranged near the incisal edge of the tooth, which allows only a short lap over the opposing teeth.
Silica	sĭl′-ĭ-kä		n	×	·	✓	·	✓	A white or colorless, extremely hard crystalline substance. Silicon-dioxid, SiO_2, formed pure as quartz, insoluble in water and all acids except hydrofluoric.
Silver	sĭl′-vĕr		n	×	✓	✓	✓	×	A metal of a white color, having a specific gravity of 10.4 to 10.7, harder than gold and softer than copper. At. wt. 107.9. Fuses at 1904° F.
Soft-solder	soft-sŏd′-ĕr		n	·	o	o	o	×	A solder which melts below a red heat, usually restricted to alloys of tin and lead.
Solder	sŏd′-ĕr		n	✓	o	o	·	✓	A fusible alloy used for joining two metallic substances or surfaces.
Soldering-block	sŏd′-ĕr-ing-blŏk		n	·	o	o	o	·	A tool or support for pieces while they are being soldered.
Soldering-flame	sŏd′-ĕr-ing-flām	✓	n	o	o	o	o	o	Same as reducing-flame.
Soldering-iron	sŏd′-ĕr-ing-ī′ ĕrn		n	·	o	o	o	·	A tool with which soft-solder is melted and applied.
Straight-pin Teeth	strāt′-pĭn teeth	·	n	o	o	o	o	o	Artificial teeth with the pins arranged in a line parallel with the long axis of the tooth.—*Com*.
Talon	tăl′-ŏn		n	✓	×	o	×	×	The posterior prominence or heel of the upper molar crown, the hypocone.—*Osborn*.
Talonid	tăl′-ŏn-ĭd		n	o	o	o	o	o	The heel or posterior portion of the lower molar crown,—hypoconid, hypoconulid, and entoconid.—*Osborn*.
Theca	thē′-că		n	×	×	×	·	✓	A sheath or case.—*Standard*.
Thecal	thē′-căl		a	✓	×	✓	o	✓	Pertaining to a theca.
Thecodont	thĕk′-ō-dŏnt		a	×	o	o	o	×	Applied to teeth lodged in alveoli.—*Huxley*. (Add to Owen's definition.)
Titanium	tī-tā′-nĭ-ŭm		n	×	o	×	×	×	A metal which is not found native, but, as artificially prepared, is a dark gray powder having a decided metallic luster and resembling iron in appearance. At. wt. 48.1. Fusible in oxyhydrogen flame.
Triconodont	trī-cŏn′-ō-dŏnt		a	×	o	o	o	×	Having three cones in a line.—*Owen*.

Trigonodont	trī-gŏn′-ō-dŏnt	n	o	o	o	o	o	A tooth having three cones in a triangle.—*Rütimeyer.*
Trituberculy	trī-tū-bĕr′-cū-lī	a	o	o	o	o	o	Pertaining to the theory of the primitive tri-tubercular type of molar teeth, or the ancestral form of all molars.—*Cope.*
Truncate	trŭn′-kāte	a	×	o	×	×	×	Cut off or terminated abruptly.—*Standard.*
Vulcanite	vŭl′-kăn-īt	n	×	×	×	×	×	The harder of two forms of vulcanized India rubber, the other form being known as soft or flexible vulcanite. Vulcanite differs from flexible or soft vulcanite in that it contains more sulfur and is vulcanized at a higher temperature.
Vulcanite Flask	vŭl′-kăn-īt fläsk	n	×	o	o	o	o	A sectional iron box for holding an artificial denture while being vulcanized. The flask is heated in a vulcanizing oven.
Vulcanization	vŭl′-kăn-ī-zā-shun	n	×	×	o	×	×	A method of treating caoutchouc or India rubber with some form of sulfur to effect certain changes in its properties and yield a *soft* (vulcanized India rubber) or a *hard* (vulcanite) product.
Zinc	zĭngk	n	×	×	×	×	×	A useful metal, more tenacious than lead or tin, but malleable only at a temperature between 200° and 250° F. At. wt. 64.9. Specific gravity 6.9.
Zylonite *Remarks.*—Preferred spelling, Xy′-lo-nite.	zī′-lō-nīt	n	×	o	×	o	×	Same as Celluloid.

DISCUSSION.

DR. BARRETT: I can most heartily commend this report, and yet I am inclined to think it oversteps a trifle the bounds that should be prescribed for the work of this Committee. It is not a committee on philology. Strictly speaking, it is a committee that has for its especial sphere the consideration of professional nomenclature, dental nomenclature; and if we go outside of that into the general field of philology, we are opening up something that will be so broad that it will take the place of other more important matter.

With that single criticism I most heartily commend the paper, because I believe it is in the line of general advancement.

DR. TAFT: In reply to Dr. Barrett, I should like to know how we can study the subject of nomenclature without words? He condemns the report in that particular, that it enters upon the consideration of the subject of philology. Now, if he can separate the matter of philology and nomenclature, he will perhaps do what some of the rest of us cannot do.

DR. BARRETT: Well, I would not have Dr. Taft or any other member of this Association get along without words. I am sure that Dr. Taft would find an early death if he were restricted in this respect. We are supposed to have some knowledge of general literature and general nomenclature. To my apprehension the subject for the consideration of this body is that which is professional. When we become extra-professional, and enter the general field of philology, I think we have opened a field that is altogether too wide for our consideration here. That is all. I most heartily commend the report, only I think we should prescribe some bounds for the subject.

DR. STELLWAGEN: Having done a little work in that direction, I can well appreciate what the labors of this Committee have been. In heartily commending its work, I think that the Committee would feel more complimented if, while accepting its report, we defer the indorsement of these words until we have seen them in print, and had time to critically examine them. Therefore will we not be better able to discuss the pronunciation next year? Some of the words as they were read over seemed a little peculiar, and there should be a very close examination into the etymology and meanings. Notice of the various channels through which these words have reached the English language would be of profit, and it probably will benefit us all to study them. Therefore, I hope that in accepting the report we shall not of necessity accept the conclusions as to pronunciations.

DR. GUILFORD: Your Committee has undertaken and pursued this work solely for the good of the profession. The time and labor bestowed upon it has been very great, but it has been a labor of love, because it has been in the line of dental education. Our work has not been free from error and imperfections by any means, but to make it what it should be we will need the coöperation of the whole Association. We desire criticism and suggestions, and any such sent to any member of the Committee will be gratefully received and carefully considered.

REMARKS BY CORYDON PALMER ON SPECIAL APPLIANCES IN OPERATIVE DENTISTRY.

THE PRESIDENT: A very old and distinguished member of this society has something of importance to present. Time was accorded to him yesterday. Dr. Corydon Palmer will now address the Association.

DR. CORYDON PALMER: What I have to-day I have prepared especially for this meeting, and as a continuation of what I have heretofore done. It is a revision of the instrument for making holes in the rubber-dam in the mouth after it has been adjusted on other teeth. Now, I encountered opposition in the making of my appliance, because the manufacturers said the principle was false, that it could not be that the punch would cut on soft steel. Notwithstanding, I have been able to do it myself. I have the original, which I have used ever since. Now, what I show you to-day I ask you not to try on any hard substance. These are my gems, and I wish to preserve them perfectly. I want you to try them as I direct, returning them to me safely. This (exhibiting the instrument) is my little gem. I brought forward the idea of having a curve in the joint of the instrument, so that in using it in the mouth, the joint should be so out of the way as to enable one to see just what is being done. Here is a little instrument for handling wedges between the teeth, and for pulling them out, and it is nice to take off a ligature with. I will pass it around and you may see it. Let me say, all of you use wood for wedges. Now, the orange-wood that you use is no better than straw. Do not have anything to do with it. All honor to the fine separators that we have. They are beautiful, and they have their place. But for all that, sometimes we need the use of wedges. Now if you want wood for wedges, nothing but the finest quality of Turkish boxwood is right for the purpose. Get the finest quality of Turkish

boxwood, cut it to suitable strips, and then you have something you can rely on.

Here is my wedge-cutter. It is on a curve. I have had to fight for this. They said it could not be done, that to make a curved joint was false, that it is not a true mechanical principle. I say if the surgery of the mouth calls for it, that it should be on a curve. You can reach any part of the mouth and see what you are doing. It will apply to the lingual surfaces of the anterior teeth and to the surfaces of the molars. If these instruments are produced, and you should get one, do not take it to cut off a little gold screw, nor to cut anything but wood. This is what it is made for, and if you use it for anything else you will spoil it. Do not take these little wedge forceps to handle engine bits. I want you to mind that. There are pliers made for that, and you can get them. Here I have three sizes of punches for the dam; they are Nos. 1, 2, and 3. As I pass them around you may try them. They cut upon the soft steel. I have made these instruments entirely myself. They are all the work of my own hands. I think there is this advantage in what I am doing, that knowing the use of the instruments, and the want of them, I have been able to so form them that they will be able to reach any part of the mouth, and more nearly meet the requirements than anything that has been heretofore offered.

THE PRESIDENT: I am very sure that every one is very much obliged to Dr. Palmer.

[It was moved that the thanks of the Association be extended to Dr. Palmer.]

DR. STELLWAGEN: I second the motion, and in doing so wish to say that one of the regrets of my life-time is that while writing years ago of some instruments which Dr. Palmer had made and called my attention to, I had said they were poetry in steel; yet after the manuscript was read by a dear friend for revision, he said to me, "Stellwagen, don't slop over," and I allowed that expression to be changed. Ever since then it has been a regret that contemptible cowardice made me not insist that the expression should stand. I slop over, in the presence of this Association, if saying that these instruments are poetry in steel is slopping over. I say further that for years I have used instruments very similar to these, but not as fine. For sweetness of cutting, these wedge-cutters seem to be incomparably superior to all others, cutting through oil or fat rather than cutting through wood. I heartily second the motion.

[The motion was carried.]

STANDING RESOLUTIONS.

The following standing resolutions are in force at this time, August, 1897 :

Resolved That henceforth no person shall be received as a delegate who is in arrears for dues, or until he has paid to the Treasurer the full amount due at the time his name was dropped for non-payment.

Adopted 1874.

Resolved, That hereafter no dental college shall be entitled to representation in this Association that does not require a good English education as a preliminary qualification for its matriculants, to be ascertained by examination.

Adopted 1879.

Resolved, That hereafter no society shall be entitled to representation in this Association that does not require its members to live up to the requirements of our Code of Ethics.

Resolved, When it comes to the knowledge of the Committee on Credentials that any applicant for membership is violating our Code, said applicant shall not be received, and all such applicants shall be referred by the Committee to the societies whose delegates they are, and in no case shall this Association be compelled to treat with violations of the Code, except where the violator is a member of this body and has no membership in any local society.

Adopted 1881.

Resolved, That the Secretary be instructed to assign members, who may neglect to make their own choice, the Section in which they are expected to work.

Adopted 1879.

Resolved, That the reports of Sections shall be called by the President in consecutive order, beginning each succeeding year one number higher than on the preceding year.

1879	commencing	with	No. I.	1895	commencing	with	No. III.
1885	"	"	No. VII.	1896	"	"	No. IV.
1886	"	"	No. I.	1897	"	"	No. V.
1892	"	"	No. VII.	1898	"	"	No. VI.
1893	"	"	No. I.	1899	"	"	No. VII.
1894	"	"	No. II.	1900	"	"	No. I.

Adopted 1879.

Resolved, That a paper presented to the Committee on Voluntary Essays and by them considered and returned to the writer with notification that the said paper is not accepted, cannot afterward be read before the Association unless it is made the special order by resolution adopted.

Adopted 1885.

It shall be the duty of the Executive Committee of the Association to provide at the opening of each annual meeting a book for the registration of members or visitors as they arrive, which shall also give place of residence and hotel where each may be found.

Adopted 1886.

Resolved, That in the future this Association discountenance the giving of banquets, excursions, entertainments, etc., by local professional societies or individuals, either during or at the close of our annual meetings.

Adopted 1886.

Resolved, That it shall be the duty of the Chairman of the Credentials Committee to procure and keep a book wherein each delegate who wishes to be considered a permanent member of this Association shall enter his name.

Adopted 1886.

Resolved, That it is unprofessional to use on cards or signs anything except name, title, and address.

Adopted 1888.

Resolved, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in this Association without the payment of dues; and any member of this Association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the Treasurer of the Association.

Adopted 1889.

WHEREAS, The National Association of Dental Faculties has passed a resolution adopting a three years' course of instruction after matriculation as essential to graduation; therefore

Resolved, That in the future no dental college shall be represented in this Association that does not comply with the course of instruction adopted by the college association named.

Adopted 1889.

Resolved, That this Association now in session direct that Sections belonging thereto shall in the future be prohibited from inviting individuals who are violating the Code of Ethics to hold clinics or to give other exhibitions before this body.

Adopted 1891.

Resolved, That a permanent Standing Committee on Necrology be appointed, to consist of five members, whose duty it shall be to act, without further instruction from this body, as occasion may require, and report to the annual meeting of the Association.

Adopted 1891.

WHEREAS, Section I has been unable in recent years to obtain sufficient matter to make a proper report; and

WHEREAS, It is the opinion of the Section that it is properly entitled to papers on crown-work, bridge-work, and orthodontia; therefore, be it

Resolved, That hereafter all papers on these subjects shall be submitted to Section I.

Adopted 1892.

Resolved, That a Standing Committee, to be styled the "Committee on State and Local Organizations," and composed of three members, shall be appointed, originally for terms of one, two, and three years respectively, and that all vacancies due to expiration of term shall thereafter be filled for terms of three years. All vacancies occurring from any other cause shall be filled for the unexpired term.

The basis of the plan and scope of work of said Committee, and its duties in relation thereto, shall be the suggestions as set forth in the address of the President of the American Dental Association for the year 1892; also the articles from which he quotes, and in harmony with the circular letters issued by the Chairman of the Executive Committee.

Adopted 1892.

Resolved, That two general addresses be delivered annually, on the second and third days' meetings, on some general topics of interest to the whole profession, the subjects to be selected by the third division of the Executive Committee, the first division of the Executive Committee to nominate the essayists annually.

Adopted 1894.

Resolved, That a Standing Committee of nine be appointed, to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

Adopted 1894.

Resolved, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

Adopted 1895.

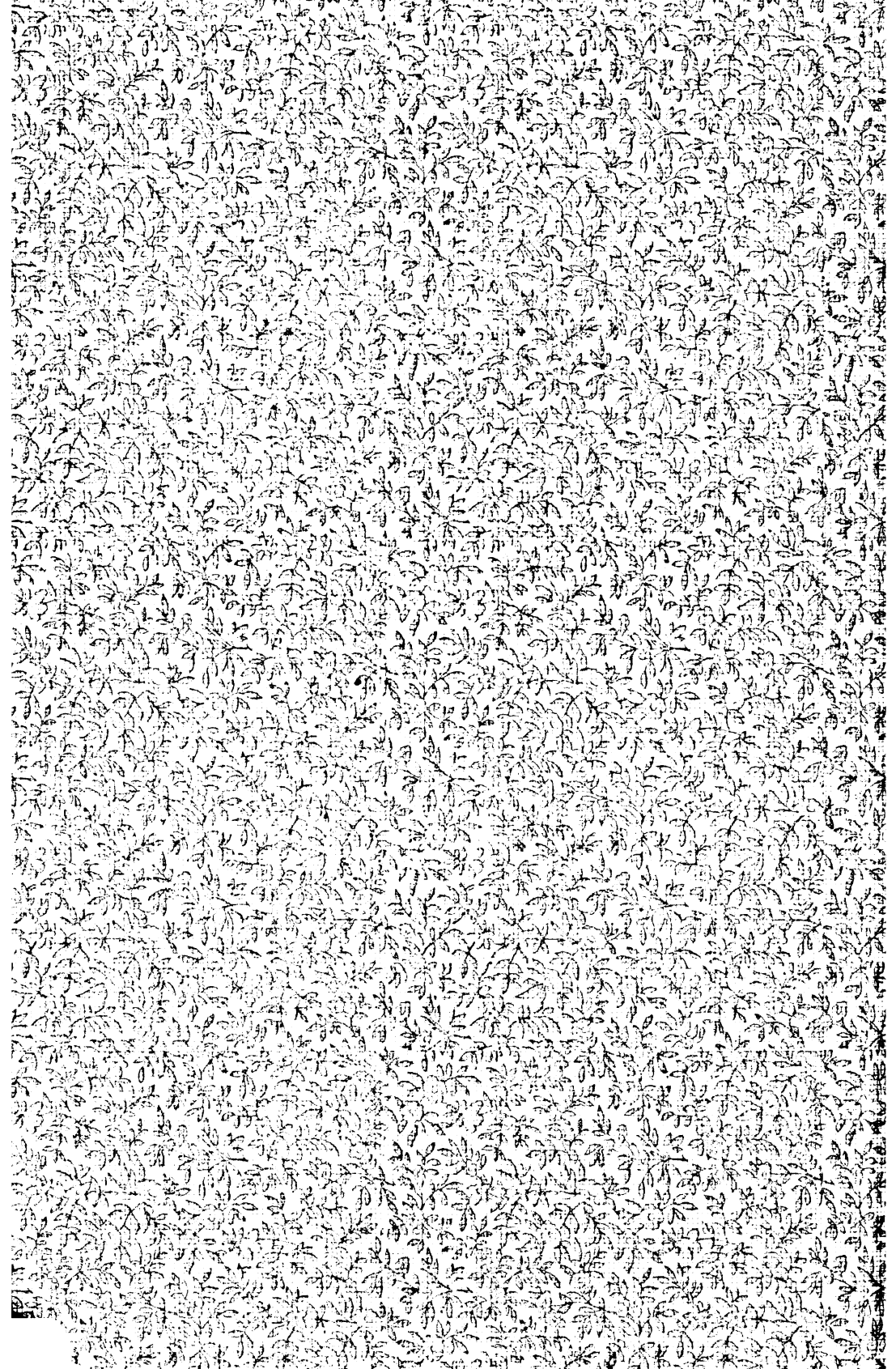
Resolved, That a committee of three be appointed by the chair to cooperate with the Army Medical Museum and Library managers in enriching

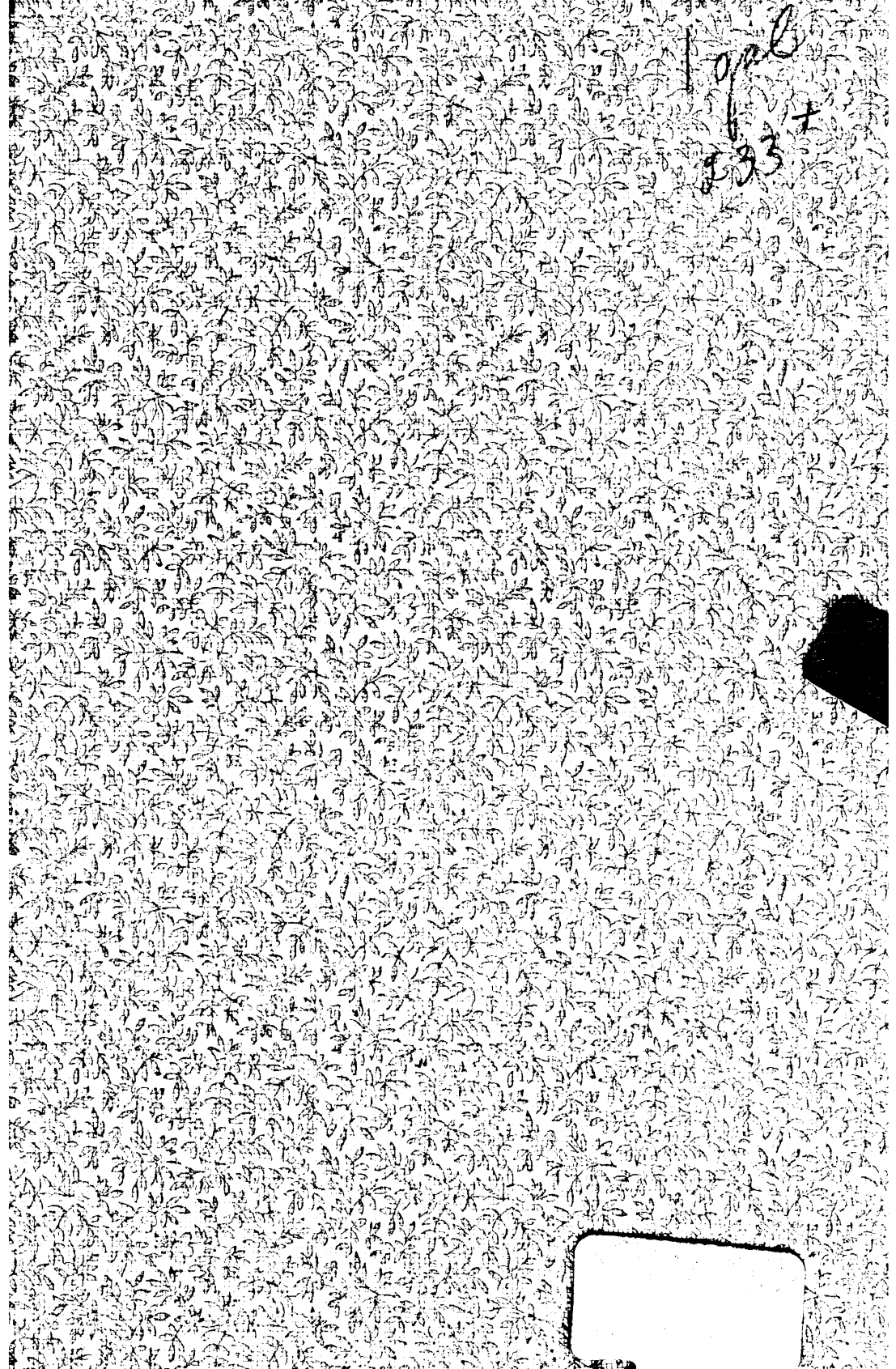
its stores of dental literature and museum specimens, especially by appealing to dental societies and individual members of the dental profession for material assistance.

Adopted 1895.

Resolved, That the American Dental Association condemns the use of secret preparations known as "*local anesthetics*," as well as all other secret preparations.

Adopted 1895.





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